

CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.
Published by the MacLean Publishing Company, Limited, Toronto, Canada.

Vol. XXI. No. 4.

Publication Office: Toronto, January 23, 1919

Subscription Price
\$3.00 per Year

SKF

16 No 4

HANGERS

Save 15 to 33% power
Cut lubrication 80%

INVESTIGATE

Canadian **SKF** Company Limited

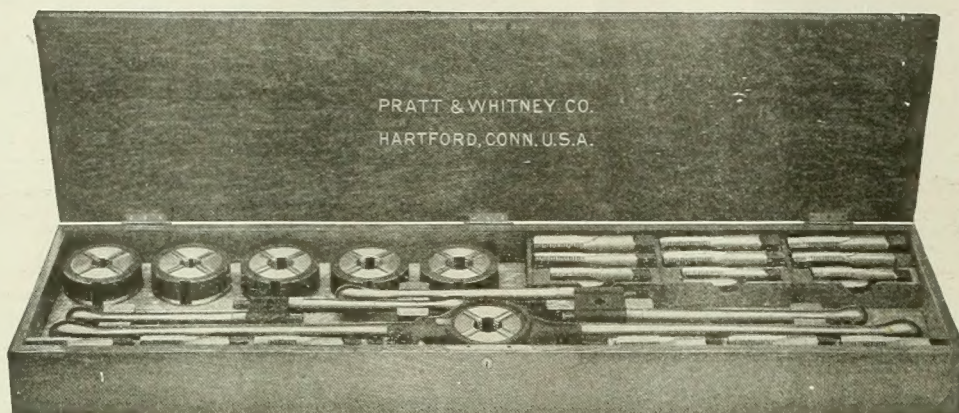
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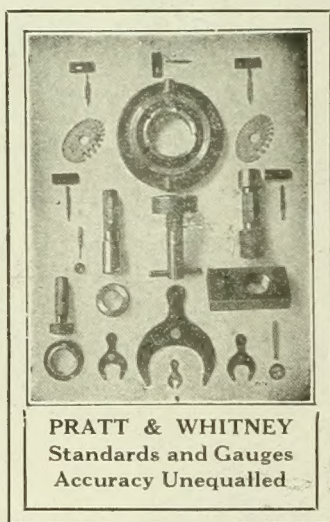
CANADIAN MACHINERY

SMALL TOOLS



P. & W. Die-Stock Set No. 4

These sets are furnished in various capacities for either U.S. Standard, S.A.E. Standard, Whitworth Standard or "V" Form. The Pratt & Whitney Policy of highest quality materials, together with the necessary refinement and accuracy, is maintained in all tools composing these sets.



PRATT & WHITNEY
Standards and Gauges
Accuracy Unequalled

PROMPT SERVICE

is assured at our nearest store where P. & W. Small Tools are carried in stock. Place your order there to-day.

PRATT & WHITNEY CO. OF CANADA, LIMITED

Works: DUNDAS, ONTARIO

MONTREAL
723 Drummond Bldg.

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VANCOUVER
B.C. Equipment Co.



BERTRAM MACHINE TOOLS

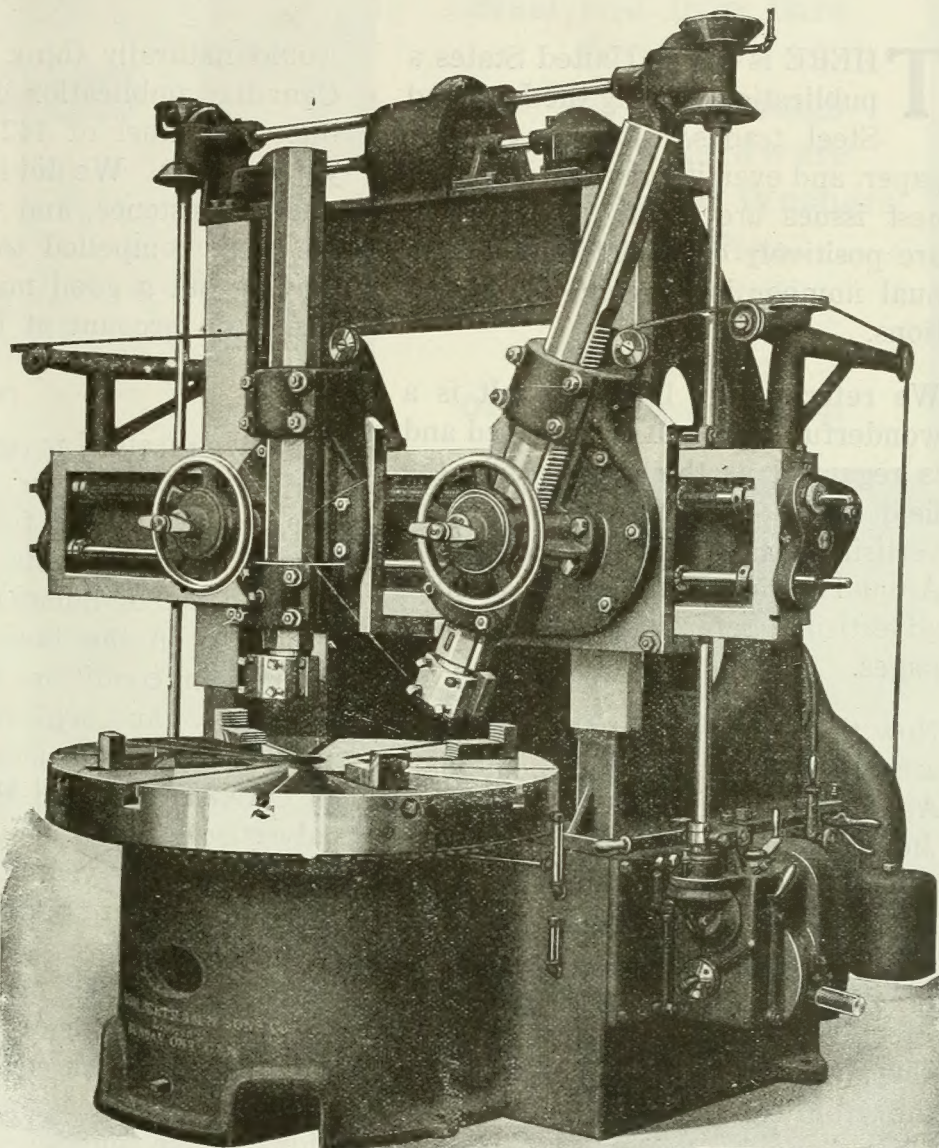
42-inch Vertical Boring and Turning Mill

Niles Type

Motor
Driven
Through
Speed Box

Built in
sizes from
42-inch to
100-inch
Swing

Drop us a
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particulars.



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The John Bertram & Sons Company Limited

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The Publisher's Page

TORONTO

JANUARY 23, 1919

THERE is in the United States a publication serving the Iron and Steel trades. It is a weekly paper, and even its smallest and thinnest issues are stout. Other issues are positively corpulent, and its annual number is huge in its proportions.

We refer to the Iron Age. It is a wonderful paper. It is respected and is regarded as the authority in the field it serves. The volume of advertising it carries is tremendous. Its Annual Review Number is a valuable advertising reference of over 668 pages.

Now the publishers of the Iron Age are wont to mildly brag about their Annual Number, and we don't blame them, because we're going to do the same about our own Annual Number. And, if we had an Annual Number as big as the Iron Age we'd probably brag harder and longer.

The Annual Review Number of the Iron Age contains 668 pages. The Annual Review Number of CANADIAN MACHINERY contains 442 pages. The population of the United States is approximately fourteen times greater than the population of Canada. Canadian industries are fewer and farther between. One

would naturally think, then, that a Canadian publication could not produce a number of 442 pages. And yet we did it. We did it, too, without undue insistence, and what is more, we were compelled to go to press, leaving out a good many advertisements on account of late copy and cuts.

We have received many complimentary letters about our Annual Number, and we take it for granted that many think what few take the time to express. A number of this kind produced in the face of a radical change in conditions is, we flatter ourselves, an achievement to be proud of. To us it is an endorsement of CANADIAN MACHINERY by its advertisers—by firms who have used it regularly for years, and especially during the years of the war. To us it means an expression of confidence that the journal which served so faithfully in time of war would be able to serve with equal faithfulness in the time of peace and reconstruction. Their confidence has not been misplaced.

We take off our hats to the Iron Age, and we congratulate it, because we know its achievement is the result of service—just as ours has been.

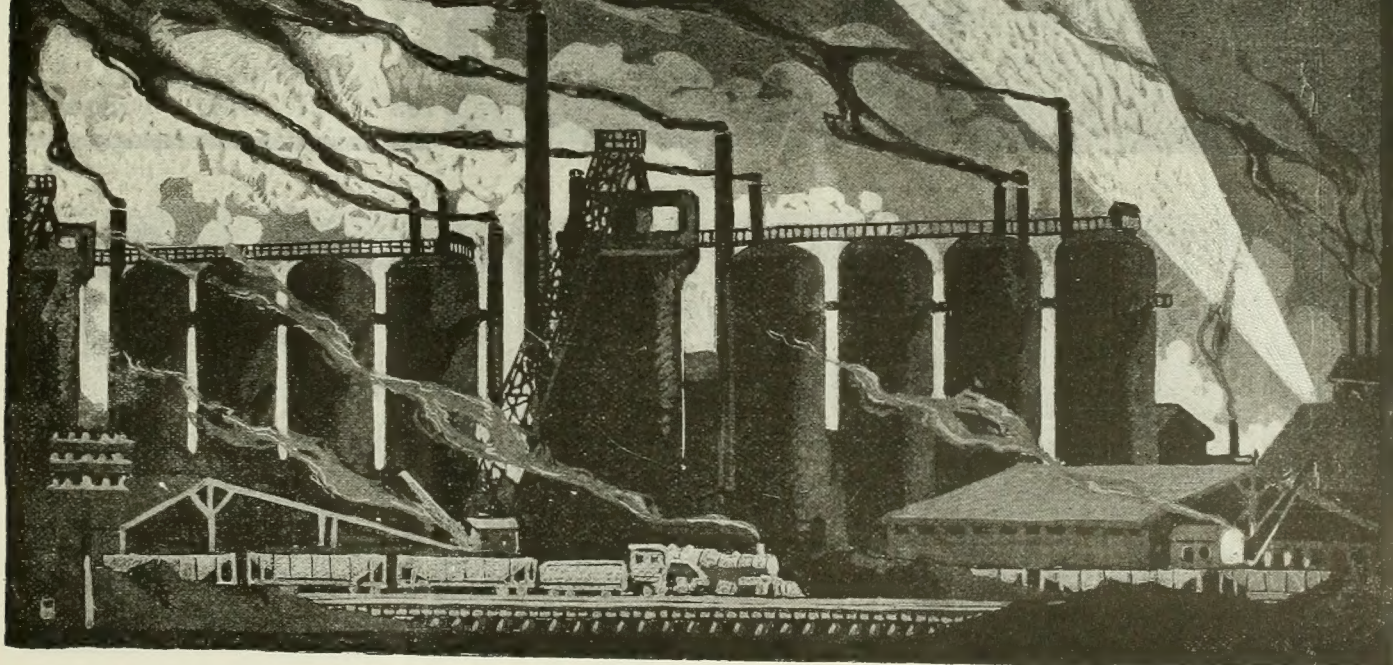
Quality

Service

PRODUCTS

"Hamilton" Pig Iron
Open Hearth Steel Billets
Steel and Iron Bars
Forgings
Railway Fastenings
Pole Line Hardware
Bolts, Nuts and Washers
Wrought Pipe
Screws, Wire
and
Wire Products
of every description

THE STEEL COMPANY OF CANADA LIMITED HAMILTON MONTREAL



L-XX HIGH SPEED and other **ATLAS TOOL STEELS** *of Quality*

TRADE MARK
REGISTERED

U.S. PATENT
OFFICE

GRADES: L-XX High Speed Steel—Atlas Hot Die Steel—Atlas Special Alloy—Atlas Triple Extra Tool Steel—Atlas Double Extra Tool Steel—Atlas Refined Tool Steel—Deward Oil Hardening, Non-Shrinking Tool Steel—E. B. Alloy—A C S C O Special Steels.

Standard Machinery & Supplies, Limited
261 Notre Dame St. West, Montreal

Western Representative : WM. W. HICKS, 557 Banning St., Winnipeg

**Coal
Coke
Iron Ore**



Pig Iron

Victoria FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.
Port Colborne, Ontario, Canada

M.A. HANNA & Co.

Sales Agents, CLEVELAND

Canadian Office :
703 C.P.R. Bldg., Toronto

FIRTH'S

Speedicut ^{HIGH SPEED} Steel
The Ideal Steel for Machining Shells

FIRTH'S CARBON TOOL STEELS

Standard Brands Highest Quality

THOS. FIRTH & SONS, Limited, Sheffield, England

CANADIAN WAREHOUSES

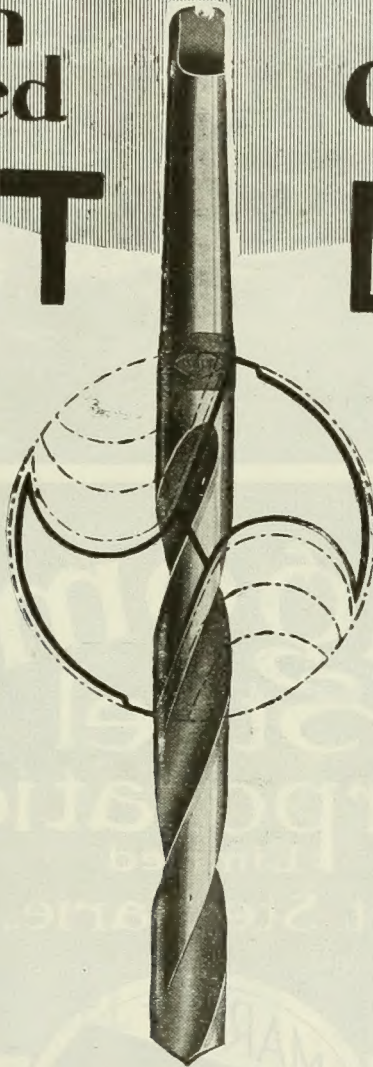
449 St. Paul St. West, MONTREAL
79 West Adelaide St., TORONTO

J. A. SHERWOOD
Canadian Manager

WILT

High Speed and Carbon

TWIST DRILLS



*Where
There's a
WILT---
There's the
Way*

The War is Won and WILT Twist Drills have truly done their bit. They never faltered — were there going strong — under all kinds of trying conditions.

Every variety of workman from the Green Mechanic to the Expert Machinist found a friend in WILT Twist Drills.

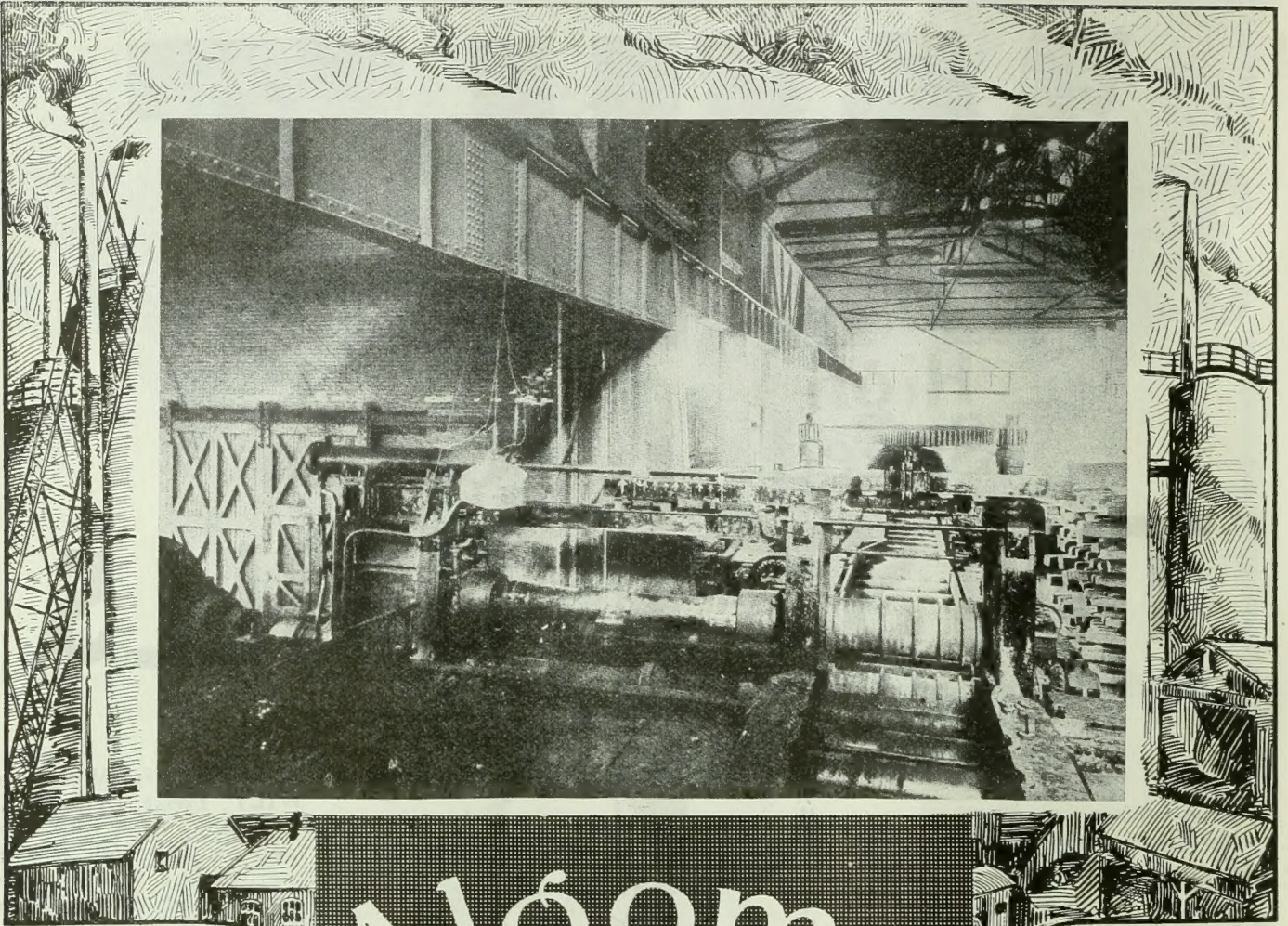
Their **Efficient, Durable** and **Economical** service will still be in evidence during the world's reconstruction period.

WILT TWIST DRILL CO.

OF CANADA, LIMITED

WALKERVILLE - - ONTARIO

London Office, Wilt Twist Drill Agency,
Moorgate Hall, Finsbury Pavement, London, E.C. 2, England



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BILLETS,
SLABS,
STRUCTURAL
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MERCHANT
BARS
CONCRETE
REINFORCING
BARS
IRON, BRASS
AND BRONZE
CASTINGS**

**Algoma
Steel
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Sulphuric Acid. Nitre Cake

**STEEL
RAILS**
Open Hearth Quality
(All Sections from 12 lbs
to 100 lbs per yard)

**SPLICE
BARS**

**STEEL
TIE PLATES**

PIG IRON
BASIC, FOUNDRY-
BESSEMER

**SULPHATE OF
AMMONIA**

LOCOMOTIVE CASTINGS

CANADIAN STEEL FOUNDRIES, LIMITED
Transportation Building
MONTREAL



Crucible
AND
Open Hearth Steel

Tool Steel

"ARGO" BRAND HIGH-SPEED STEEL

The John Illingworth Steel Co.
1856

Frankford, Phila.
New York Office 217 Broadway

RALPH B. NORTON, AGENT
Montreal, Canada

Electrite

Electric furnaces, automatically regulated, the most modern methods, and the introduction of Uranium — make this a steel of truly remarkable cutting properties.

We know "Electrite" cannot be bettered — and stand ready to prove it to you.

LATROBE
ELECTRIC STEEL CO.
LATROBE, PA.

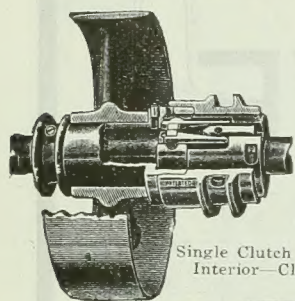
High Speed Steel

uranium

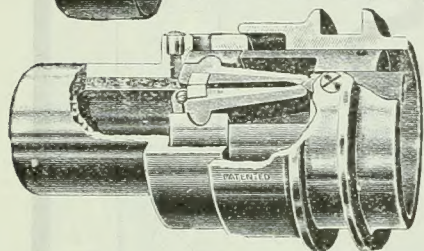
THE JOHNSON FRICTION CLUTCH

THE CLUTCH THAT CLUTCHES

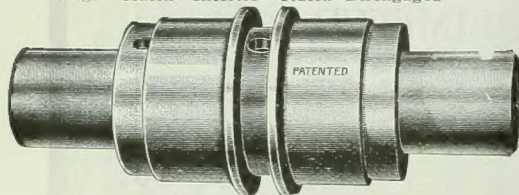
starting your machines without grating noise or jar. It is the Acme of Simplicity and is being adopted by the leading machine tool builders as a part of the machine tools they manufacture, and the Johnson Friction Clutch adds another talking point. Our booklet, "CLUTCHES AS APPLIED IN MACHINE BUILDING," is of interest to you and a copy will be sent on request. For countershaft or line shaft work the JOHNSON FRICTION CLUTCH gives the service you are looking for.



Single Clutch Pulley Mounted
Interior—Clutch Engaged



Single Clutch—Interior—Clutch Disengaged



Double Clutch—Exterior

Our Yellow Data Sheets Describe the Johnson Friction Clutch in detail. Write for them to-day.

AGENTS: CANADA—Williams & Wilson, 320 St. James St., Montreal; The Canadian Fairbanks-Morse Co., Ltd., Toronto and Branches. ENGLAND—The Efandem Co., Ltd., 159 Gt. Portland St., London, W. 1. Sole Agents for British Isles. AUSTRALIA—Edwin Wood Pty., Hdwe. Chambers, 231 Elizabeth Street, Melbourne, Victoria. JAPAN—Andrews & George Co., 16 Tategawacho, Kiobashiku, Tokyo. SOUTH AFRICA—D. Drury & Co., Main St., Johannesburg. FRANCE—Anciens Etab. Glaenger & Perraud, 18 Fauborg du Temple, Paris.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

For reconstruction work Canada needs compressed air. For pumping by the air-lift system, for hoists in all classes of work, for pneumatic riveters, chippers, drills, and grinders in structural work and in the shops. For spraying paint, cleaning out electric motors, operating air chucks, etc.

Use compressed air.

Air Compressors

For all these uses of compressed air you must have a reliable source of supply. C-I-R-Co air compressors are reliable at all times; for steady, continuous operation they have no superior. They come from a plant that has been manufacturing compressed air machinery for twenty-five years.

Our experience counts.

CANADIAN INGERSOLL-RAND COMPANY

LIMITED

Sydney

Sherbrooke

Montreal

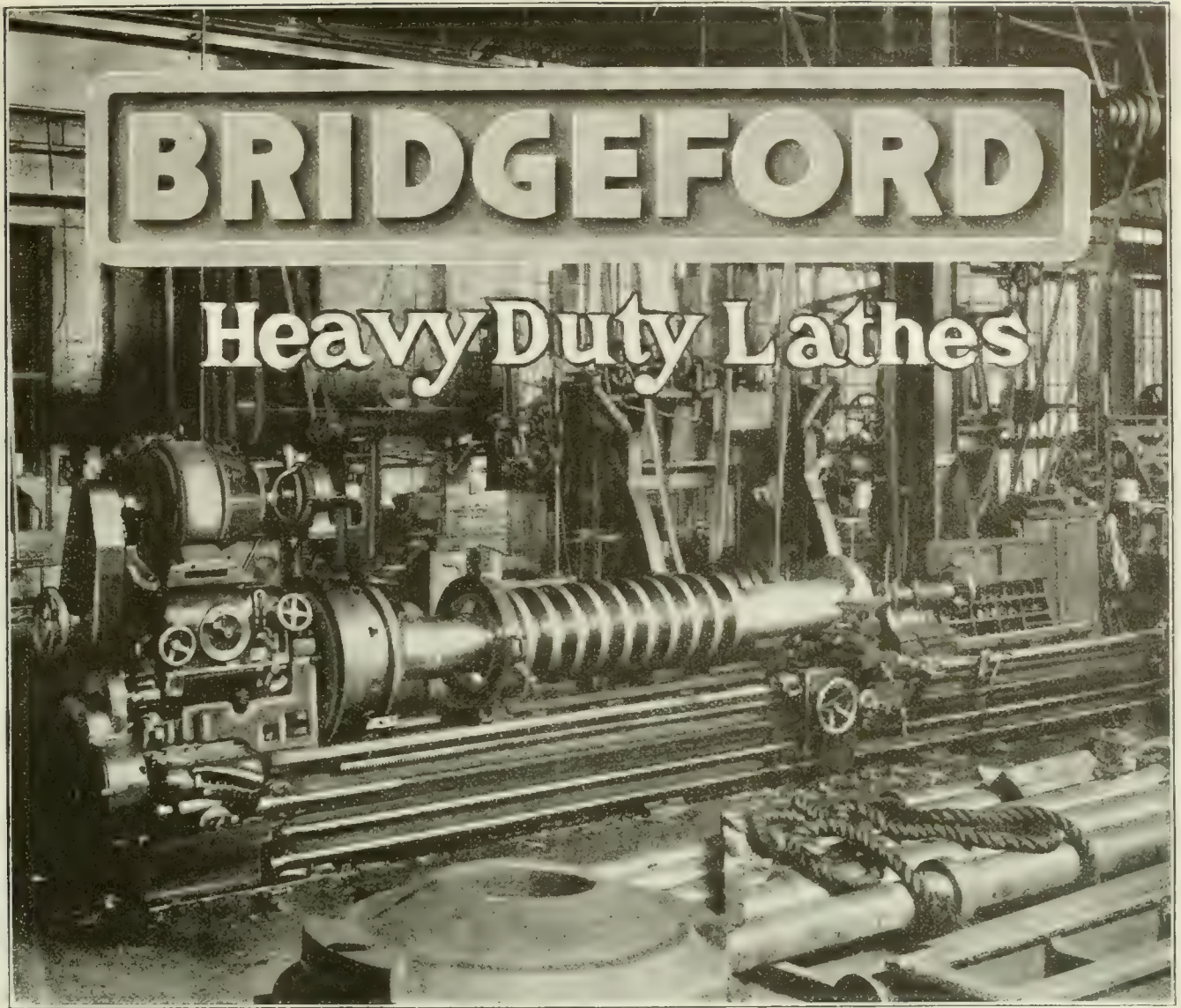
Toronto

Cobalt

Winnipeg

Nelson

Vancouver



Turning Forged Steel Thrust Shafts

The shaft shown in this lathe is a forged steel thrust shaft for one of the standard 2800 h.p. Marine Engines, built for the Emergency Fleet Corporation.

The rough size of the shaft is approximately $27\frac{1}{4}$ in. diameter by $12\frac{3}{4}$ in. long and the limits of accuracy required are .002 plus and minus.

The lathe is a 36 in. Bridgeford Engine Lathe installed in the shop of the C. & G. Cooper Co., Mount Vernon, Ohio, and is capable of taking the roughing cut as well as finishing the shaft to the close limits of accuracy required.

The Bridgeford line includes Heavy Duty Engine Lathes from 24 in. to 72 in. swing, Heavy Duty Axle Lathes and Journal Truing Lathes and Heavy Manufacturing Lathes of 27 in. and 30 in. swing.

Details and specifications of any machine required will be sent on request.

Bridgeford Machine Tool Works

161 Winton Road, Rochester, N. Y.

Manufacturers of Heavy Duty Lathes for More than Twenty Years

FORD-SMITH

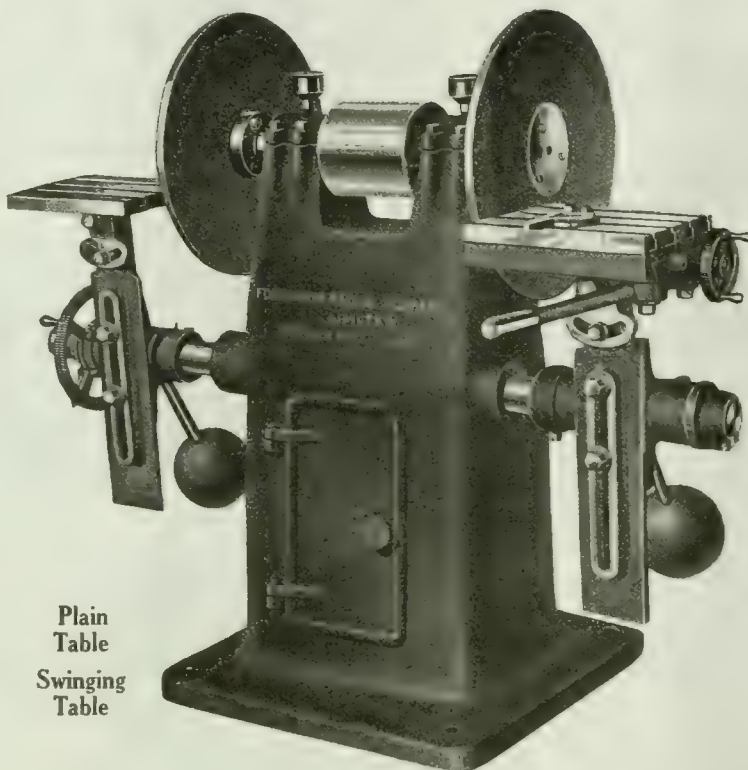
Disc Grinders

Wet-Tool
Grinders

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Grinders

Swing
Grinders

Floor
Grinders



Plain
Table
Swinging
Table

Milling
Machines

Special
Machinery

Manufactured by
**FORD-SMITH
MACHINE
CO.
LIMITED**
HAMILTON, CANADA

*Our new catalogue
is ready*



ELECTRIC Steel Castings

High Grade STEEL Castings
Of Every Description

Prompt Deliveries

Send us your drawings
for estimates.

THE ELECTRIC STEEL AND METALS
COMPANY, LIMITED

WELLAND

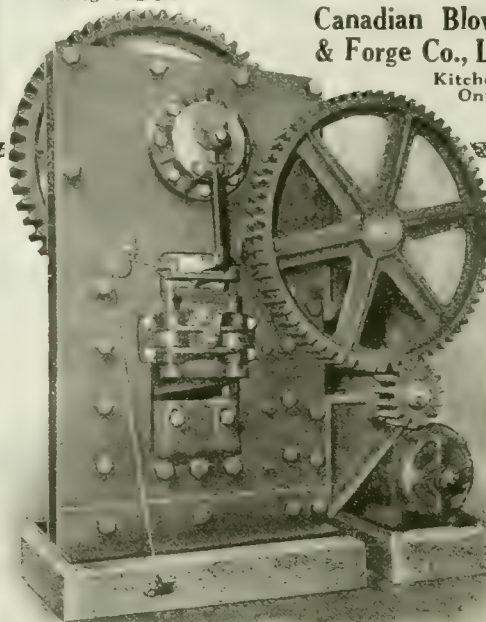
ONTARIO

CANADIAN ARMOR PLATE

PUNCHES, SLITTING SHEARS, and BAR CUTTERS are dependable. They are built of "Armor Plate" steel—tensile strength 75000 lbs. per square inch—7½ times as strong as cast iron.

That means a lighter and stronger machine—a machine built to take a lot of punishment. Write for Catalog P S-16.

Canadian Blower
& Forge Co., Ltd.
Kitchener
Ont.



Nova Scotia Steel & Coal Company

Limited

New Glasgow, Nova Scotia, Canada



THREE AND ONE-HALF AND FIVE-TON "FLUID COMPRESSED" STEEL INGOTS.

The Nova Scotia Steel & Coal Co., realizing the importance of "fluid compression" as a valuable aid in producing reliable and first-class steel products, procured by purchase the Canadian license from M. Harmet, of St. Etienne, France, whereby they own the sole rights in this Country to use his process. This they considered in accordance with their policy of taking advantage of every important metallurgical development, thus advancing with modern progress, and particularly that their high reputation as manufacturers of the best marine, railway and machine forgings obtainable should be maintained.

The "fluid compression" plant laid down at Sydney Mines, N.S., consists of one group of four Harmet presses, each of 1,250 tons and capacity to handle $3\frac{1}{2}$ to 5-ton ingots: and one of 4,000 tons to handle ingots up to 30 tons.

The product of this process is used in the manufacture of high-grade forgings, such as locomotive axles, crank shafts, marine forgings, artillery tubes and armor plate of the highest grade; in fact for all commodities in which maximum reliability and homogeneity of structure enter and are demanded.

MEN whose souls have been tried in the Crucible of War Time Service will not easily forget those forces, either Human or Mechanical, which were instrumental in achieving Victory.

"Red Cut Superior"

The Nationally Known **FIRST QUALITY**

HIGH SPEED STEEL

Is a Fighter for Efficiency in Peace Times and War Times.

Are your Tools made of **"Red Cut"**?

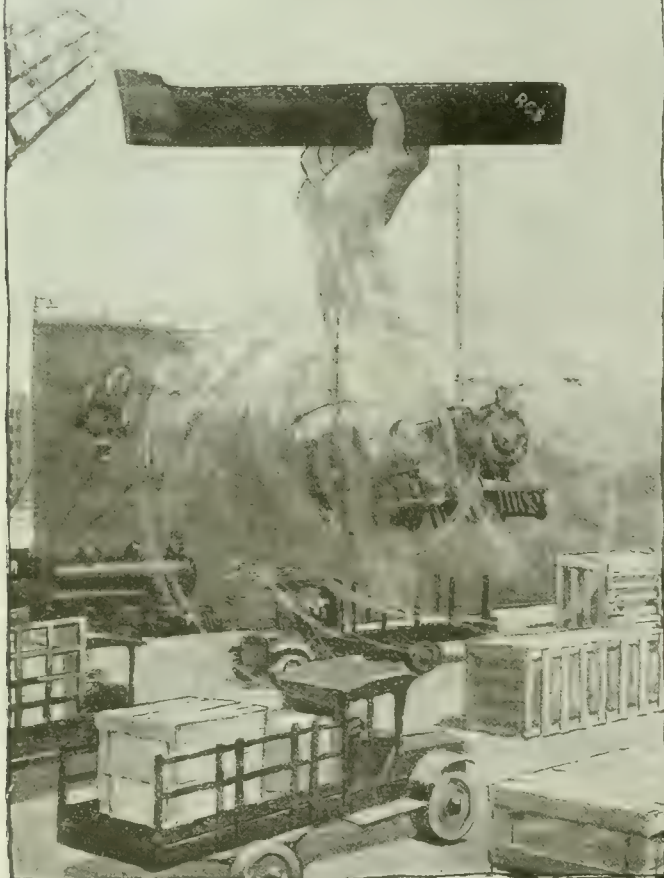
VANADIUM-ALLOYS STEEL CO.

General Sales Offices, PITTSBURGH, PA.
Works, LATROBE, PA.

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CINCINNATI

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DETROIT
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MONTREAL
NEW YORK
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Swedish Steel & Importing Co., Limited

Montreal
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Direct representatives of foremost Swedish mills; makers of

Tool Steels

ALLOY STEELS, BILLETS, BARS, DISCS, SHEETS, HIGH SPEED STEELS, DRILL RODS, DRAWN BARS, SEAMLESS TUBING, COLD ROLLED STRIP STEEL, WELDING WIRE, WROUGHT AND ROLLED IRON, PIG IRON, STEEL AND IRON ENDS, HOLLOW AND SOLID MINING DRILL STEEL.



PROMPT SHIPMENTS from large stock



A
Keen
Cutter

WOLFRAM
Is Both

VULCAN CRUCIBLE STEEL CO.
ESTABLISHED 1890. Aliquippa, Pa. U.S.A.
Represented in Canada by Messrs Norton Callard & Company, Que.
MONTREAL

Strong
in the
Neck

CANADA FOUNDRIES & FORGINGS LIMITED

Producers and Distributors

TOOL HANDLES

Made from Canadian Hardwoods

Quantity Business Preferred

Special service given export inquiries

JAS. SMART PLANT

Brockville, Ont.

The Hammer With The Human Stroke



HEADS RIVETS COLD

Heads 'em tight or loose, flush, countersunk, or finishes heads any shape desired, and at the rate of:—

A rivet a second, sizes up to 3/16".

A rivet in two seconds, size 1/4" to 3/8".

A rivet in three seconds, size 7/16" to 1/2".

And on special order we build machines to handle rivets up to 1 1/2" with proportionate rapidity.

Built in eight sizes.

Besides riveting, the High Speed Riveting Hammer does all kinds of peining, swaging, upsetting, etc.

Send us sample assembly parts with rivets or sketch of your work,

and

Let us shoulder your riveting problems.

Send for the High Speed Hammer Book.

THE HIGH SPEED HAMMER COMPANY, INC.
ROCHESTER, N.Y.

If You Need a POWER HAMMER



of uncommon strength throughout — a hammer constructed to deliver work of surpassing quality in great quantity, and to keep everlastingly at it—

You Need Jardine's

Note a few particulars:

Hammer slide is a steel casting: so is the ram, and connecting bolts for the ram are machined from solid steel bar.

Hammer and anvil dies of properly tempered, highest grade tool steel are held in machine seats by tapered keys in the ram and anvil block, so there's no need to put taper on the dies.

Jardine's Canadian Giant Power Hammer has never failed.

Write for Catalog

A. B. JARDINE & CO.
Limited

Hespeler, Ont., Canada

“WACO”

TRADE MARK



TRADE MARK



High Speed Steel

“Double Waco” Quality—for
Quick Production Work

“Turtle Brand”—High-class
Tool Steels, Files, Drills, etc.

MANUFACTURED BY

WM. ATKINS & COMPANY, LIMITED

RELIANCE STEEL WORKS

Established 1870

SHEFFIELD, ENGLAND

GEO. A. MARSHALL & CO.

*Sole Representatives
for Canada*

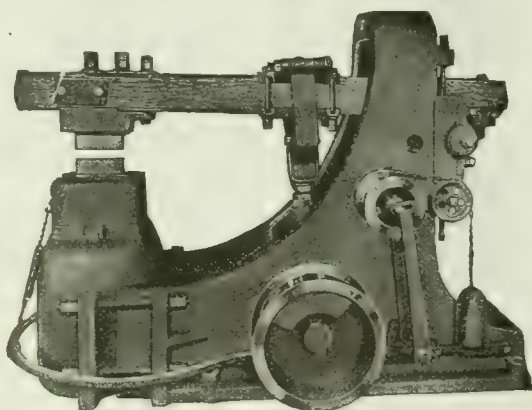
1118 Queen Street West, Toronto, Ontario

*Phone Park.
250*

A Rochester Helve Hammer
and a Smith are Mighty Good
Company for Each Other

ROCHESTER HELVE HAMMERS

Six Sizes
Two Styles of Frames

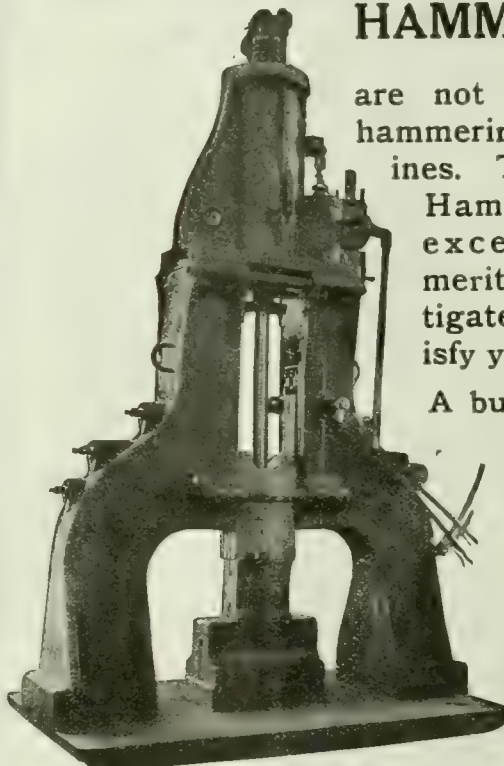


THE WEST TIRE SETTER CO.
ROCHESTER, NEW YORK

Are adjustable for
length of stroke while
running.

Long stroke provides
for handling larger
work than other ham-
mers of the same head
sizes and the springy
forging blows deliver-
ed by the solid hickory
helves combine advan-
tages of forging and
drop hammers.

“ERIE” STEAM FORGING HAMMERS



are not ordinary
hammering mach-
ines. They are
Hammers of
exceptional
merit. Invest-
igate and sat-
isfy yourself.

A bulletin for
the ask-
ing.

ERIE FOUNDRY COMPANY
ERIE, PENNSYLVANIA, U. S. A.



"Not Steel but its Master"

STELLITE is now recognized as the master Cutting Metal, and has won for itself, during the War, a reputation in the Machine Shop not enjoyed by any steel.

STELLITE is hard, tough, acid-resisting, and is immune to heat up to 2000° F. — it might help you out of some mechanical difficulty. Why not talk it over with our Service Department?

The foremost Engineering Shops in Canada and the United States are now using it in a variety of ways and constantly increasing its use and their own production.

Deloro Smelting & Refining Company, Limited

TORONTO
200 King Street West

H.O. and WORKS: DELORO, ONT.

MONTREAL
315 Craig Street West



"The Marshalltown Throatless Shears"

guarantees perfect work at less than half the ordinary expense.

Rotary, self-feeding shears designed for cutting in and out curves, straight or irregular shearing, circles, also beveling and splitting of plates. Built in various sizes having capacities from tin up to $\frac{1}{2}$ " thick. No limit to the size of sheet being cut. Hand, belt or motor drives. The last word in metal cutting shears. We also manufacture Rotary Bevel Shears, Splitting Shears and Plate Milling Machines.

Let us know your requirements.

Marshalltown Mfg. Co.
Marshalltown, Iowa
U. S. A.

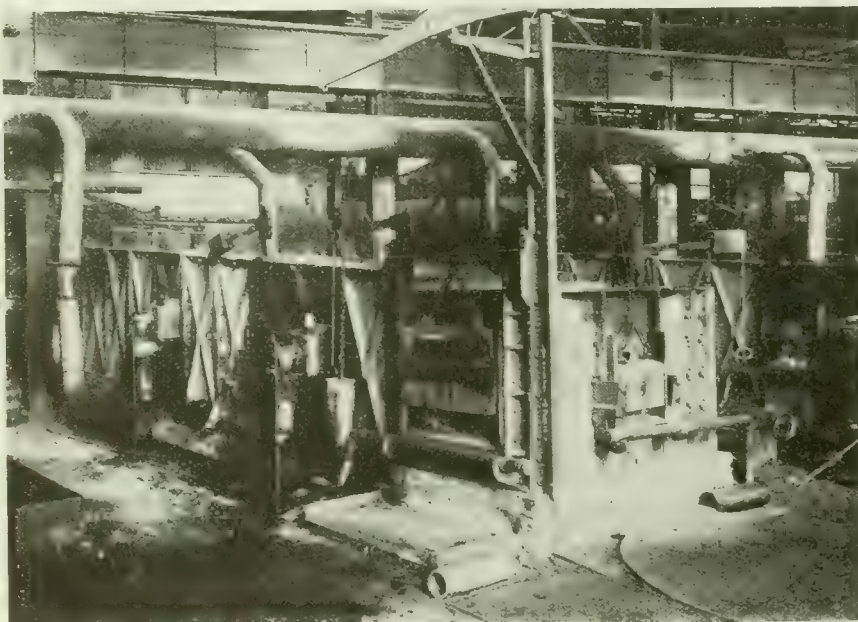
Another MECOL Furnace

demonstrated its superior features point by point to a group of men whose years of experience in the heat-treatment of metals made them appreciative

judges. We refer to the "Mecol" Furnace shown in this illustration, installed at the Pointe St. Charles Works of the Canadian Steel Foundries, Limited.

Our intimate knowledge of heat-treating methods, and our long experience in the building of efficient furnaces fit us to give helpful advice—and that we will do promptly if you

Write
Mechanical Engineering
Company, Limited
Three Rivers, Quebec, Canada



Uranium High Speed Steel

Keeps Tools in Commission

It is not to be expected that tools of an inferior grade of high-speed steel should withstand the severe service imposed on them in shops working under pressure.

Cutting tools used under such conditions should be made with URANIUM. It keeps tools in commission. It reduces breakage, and provides a tougher, harder cutting edge.

STANDARD ALLOYS COMPANY
FORBES AND MEYRAN AVENUES
PITTSBURGH PENNA.

STANDARD FURNACES

OIL
or
GAS

*Prompt delivery on all
tool room types.*

For

Annealing
Carbonizing
Hardening
High Speed Steel
Lead and Salt
Oil Tempering
Forging
Riveting

*Furnaces built for
special requirement*



Oil Tempering Furnace

TORONTO OFFICE:

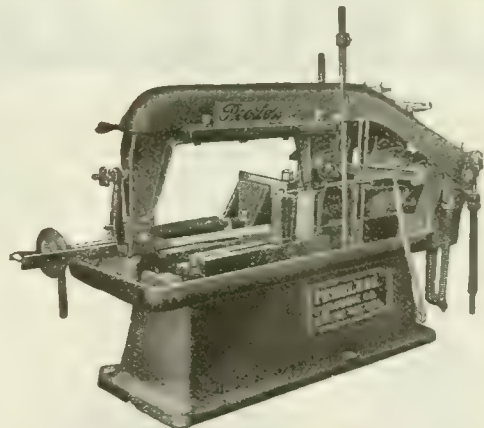
Standard Fuel Engineering Co.

W. H. KIRK, Manager

909 Excelsior Life Building
Phone Main 385



Peerless ^{HIGH} SPEED THE NEW STANDARD Increases Production 50 to 100%



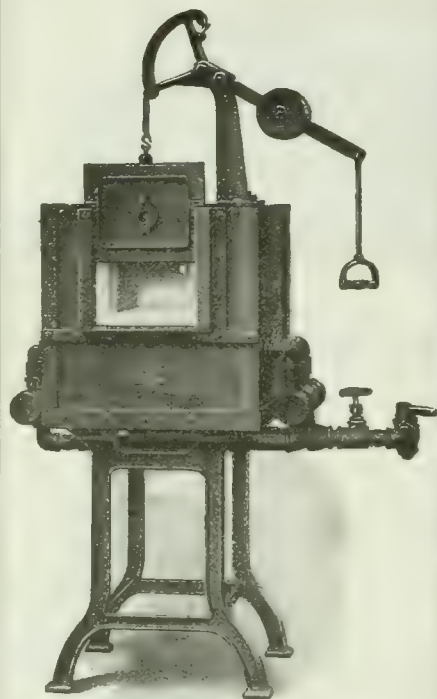
Why Not?

WHEN big plants of national reputation, who are using three, six, eight, twelve and up to thirty or more Peerless Machines say that they increase production from 50 to 100 per cent., saving in time, labor, blades and expensive material; AND WHEN we are willing to have you try out the Peerless for 30 days' at our own risk and expense, we paying freight both ways if it fails to make good; THEN WHY NOT try it out for yourselves, when the gain is more yours than ours if it makes good, and if it fails the loss is ours alone?

PEERLESS MACHINE CO.

1607 RACINE STREET

RACINE, WISCONSIN



TYPE K HIGH SPEED
STEEL FURNACE

The Right Furnace for High Speed Steel

Too much—too little or an uneven heat treatment of High Speed Steel renders it practically worthless for the purpose intended.

This Gilbert & Barker furnace has been designed especially for the correct heat treatment of High Speed Steel. A temperature of 2400°F. is quickly obtained and easily maintained. The heat is uniform on all sides of the work and loss by radiation is reduced to the minimum by special insulation.

More than 50 years' experience in designing and building furnaces, especially for the accurate and economical heat treatment of metals is your guarantee of satisfaction.

PROMPT DELIVERY ON G. & B. FURNACES

Recent additions to our plant, already one of the largest in this field, makes it possible to offer immediate shipment of your order.

Tell us your problem and we will tell you the type of furnace you require, but first send for Bulletin 24. To-day is a better day than tomorrow—write.

Gilbert & Barker Mfg. Co.

West Springfield, Mass., U.S.A.

Canadian Agents: Williams & Wilson,
Montreal, Que. New York Office,
26 Broadway



TRAHERN

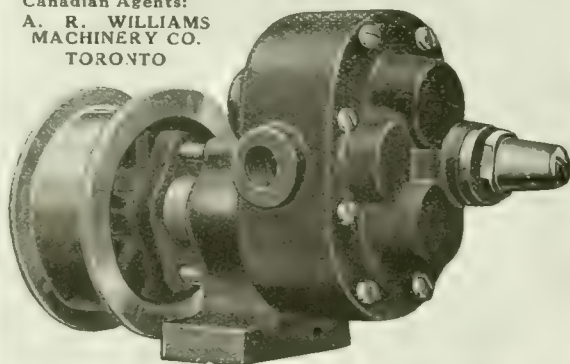
ROTARY GEARED PUMPS

Use the Individual Pump

Different classes of work require different compounds. By using the individual system, as many different compounds as desired may be used. This is a valuable feature. Trahern Rotary Geared Pumps. Would you like to try one? Write.

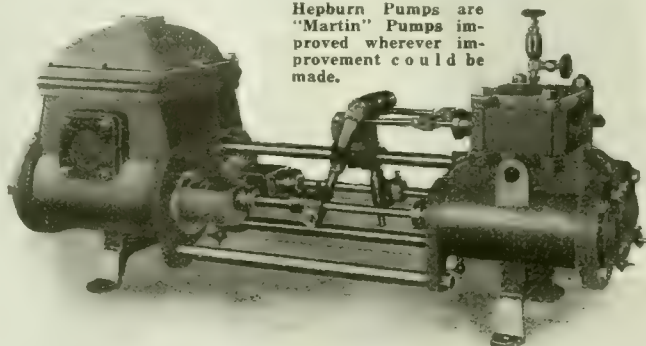
Trahern Pump Company, Rockford, Ill.

Canadian Agents:
**A. R. WILLIAMS
MACHINERY CO.
TORONTO**



Hepburn Pumping Machinery

Our line embraces standard duplex pumps for boiler feeding and for fire and general service; tank or low service duplex pumps; duplex hydraulic pumps for service in connection with hydraulic lifts and presses, accumulators and oil presses; pressure or mine pumps; horizontal power pumps and air and circulating pumps, etc.

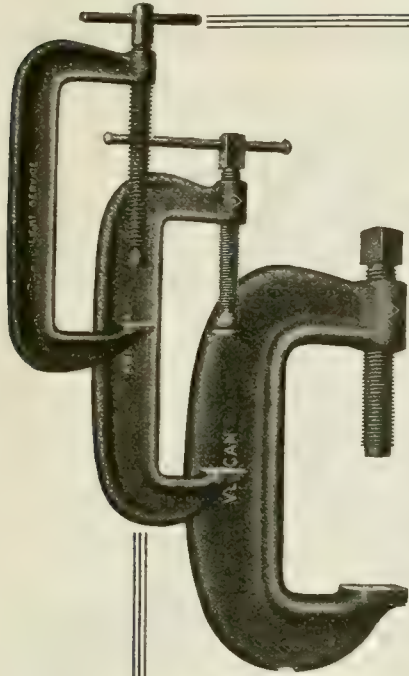


Hepburn Pumps are
"Martin" Pumps im-
proved wherever im-
provement could be
made.

JOHN T. HEPBURN, LIMITED

18-60 Van Horne Street

Toronto, Ontario



Williams' Superior Drop-Forged "C" Clamps

"THEY STAND THE STRAIN"

Both economy and convenience follow the use of tools designed for specific classes of work. Williams' line of Clamps provide something to meet the requirements of the individual job—or any combination of jobs. There's "A Williams' Clamp for every purpose."

If it's general utility—without the need for maximum strength—Williams' "Light Service" line will fit the case. 8 sizes, 2 to 12" capacities.

If it's stability and utility—medium service—Williams' "Agrippa" line offers the solution. 7 sizes, 4 to 18" capacities.

If it's extreme strength and heavy service—Williams' "Vulcan" line provides both. 11 sizes, $\frac{3}{4}$ to 12½" capacity.

All are made of a special, high grade steel. After forging they are submitted to a refining process or "heat treatment" which increases their stiffness and strength and reduces the liability of springing. Machinists' Tools booklet on request.

J. H. WILLIAMS & CO.

"The Drop-Forging People"

45 Richards St.

Brooklyn, N. Y.

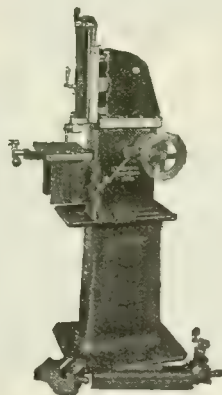
The A. G. Low Co., Ltd., 45 Pacific Ave., Saskatoon, Sask.
Agents for Manitoba, Saskatchewan, Alberta and British Columbia

A Trio of Cost Cutters

If you are interested in the serious business of increasing production and cutting costs in operations you should investigate the RHODES line of Vertical and Horizontal Shapers.

These light, powerful, quick machines will take care of your shaping and slotting, tool-making, die-making, modeling and all other light work now being done on bigger and more expensive machines. Rhodes Tools cost less to operate, work faster and more efficiently. Their capacity is large and is greatly promoted by many easily-attached adjustments.

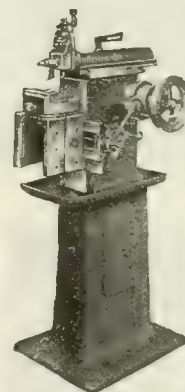
Rhodes Vertical and Horizontal Shapers are cutting costs in all parts of the world. The service they are giving to others they will give to you. Let us tell you all about this trio of successful machines. Write now!



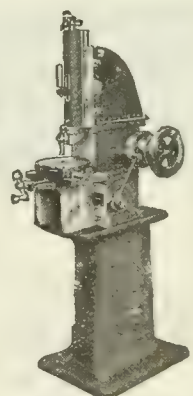
Combination

Rhodes Vertical and Horizontal Shapers

**Fast!
Accurate!
Wide Range!**



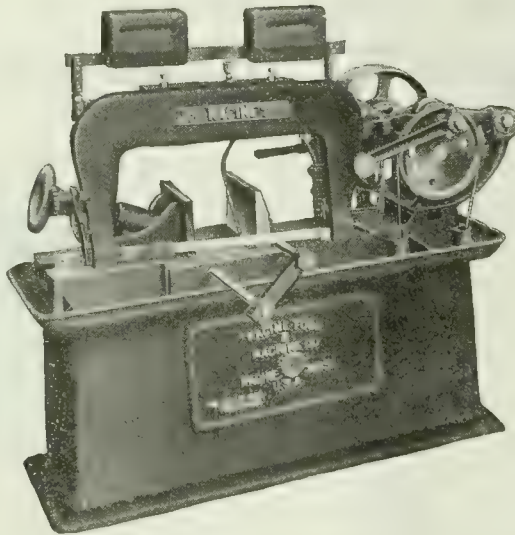
7-inch Shaper



3½-inch Slotter

The Rhodes Manufacturing Co.

Owned and Operated by the Jacobs Mfg. Co.
Hartford, Conn., U.S.A.



Use "RACINE" H. S. Tungsten Power Blades

Only on the draw stroke does the blade of this

"RACINE"

High Speed Metal Cutting Machine
come in contact with the metal—then

How It Cuts--- Deep and Quick

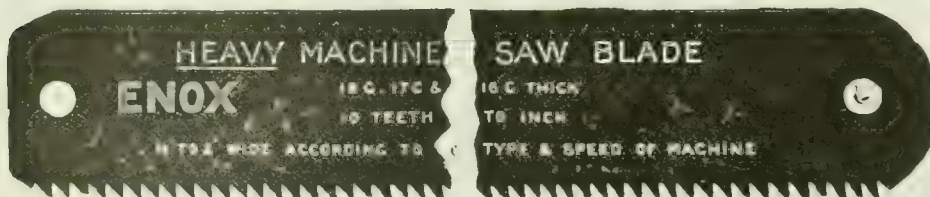
Machine is of substantial construction, designed for accuracy, for speed, for long service of both machine and blade.

The "Racine" is the only machine that duplicates every cut exactly. It has no equal for quantity of accurate work done in a day, in a year, in a lifetime.

**Standard
the World Over**

Proof for the asking.

Racine Tool & Machine Company
Melbourne Ave., Racine, Wis., U.S.A.



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ENOX Hacksaw Blades

ARE THE BEST





Starrett Hack Saws

have the Stamina, the "Punch," and the Endurance. They are made of the *right stuff*—the finest tempered Tungsten steel, with milled teeth properly set; flexible or hard backs, so they can take a lot of punishment and abuse without calling "halt" or breaking down.

Mechanics, superintendents, and "bosses" endorse and recommend Starrett Hack Saws as the truly economical saws, because they give the maximum of service for the minimum of cost.

Write for our Catalog No. 213

It describes hack saws, frames and machines, and shows you why you cannot afford to use any other than Starretts; also shows many styles and sizes of Starrett Precision Tools.

The L. S. Starrett Co., Athol, Mass.

*The World's Greatest Toolmakers
Mfrs. of Hack Saws Uneexcelled.*



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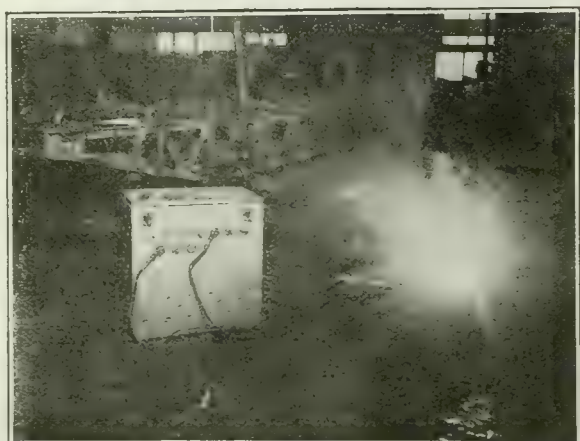
The

"MEPHISTO" WELDER

**Operates on
Alternating Current**

Portable—Highest Efficiency—Lowest Operating Cost. No moving parts, therefore no wearing parts, no upkeep cost.

*Reduces welding costs to minimum
Does not require expert to operate*



WELDING STEEL PLATE
HAMILTON BRIDGEWORKS, HAMILTON, ONT.

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"STERLING" Hack Saws

Will prove an economical investment and should be used in every machine shop.



If you care
to save money,
use "Sterling"
Blades.

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of every description



We make **Machinery
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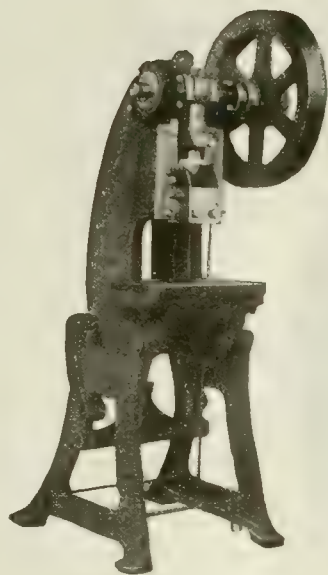
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HAVE you noticed the Consolidated Clamp Connection on all Consolidated Presses? Grips like a vise and stays put, one of the bull-dog kind, which, when properly tightened, will not break away, or slip.

If you break it we will furnish a new one free of charge.

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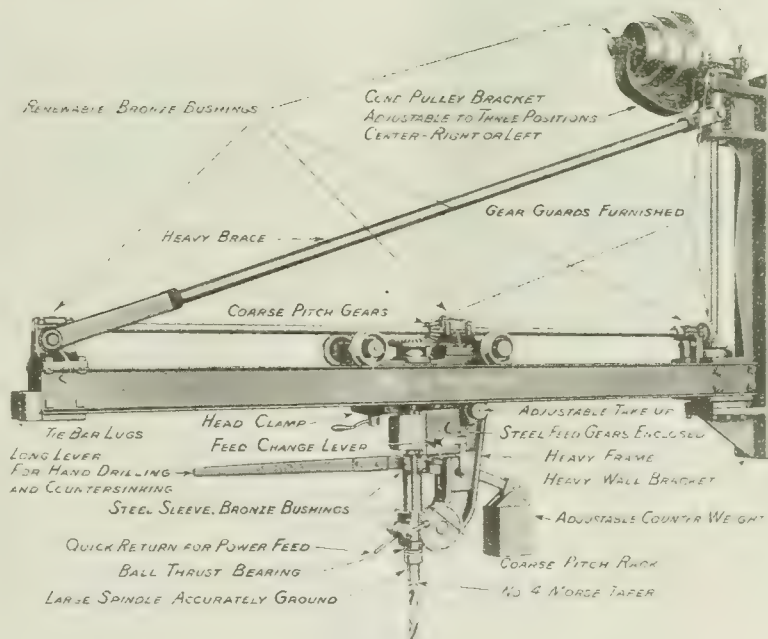
Here's a Drill You Want

The Lynd-Farquhar Wall Radial Drilling Machine is a real machine tool, carefully designed and made from the best material. The entire control of the drill is within easy reach of the operator. The arm is constructed of extra heavy channels and is supported from the outer end to the top of the wall bracket by heavy steel brace bars. The head is exceedingly rigid. It is mounted on four flanged wheels, fitted with roller bearings, and moves with extreme ease from end to end of the arm.

MADE IN FOUR STANDARD SIZES

Rated size	Drills to center of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

F.O.B. Boston, Mass.

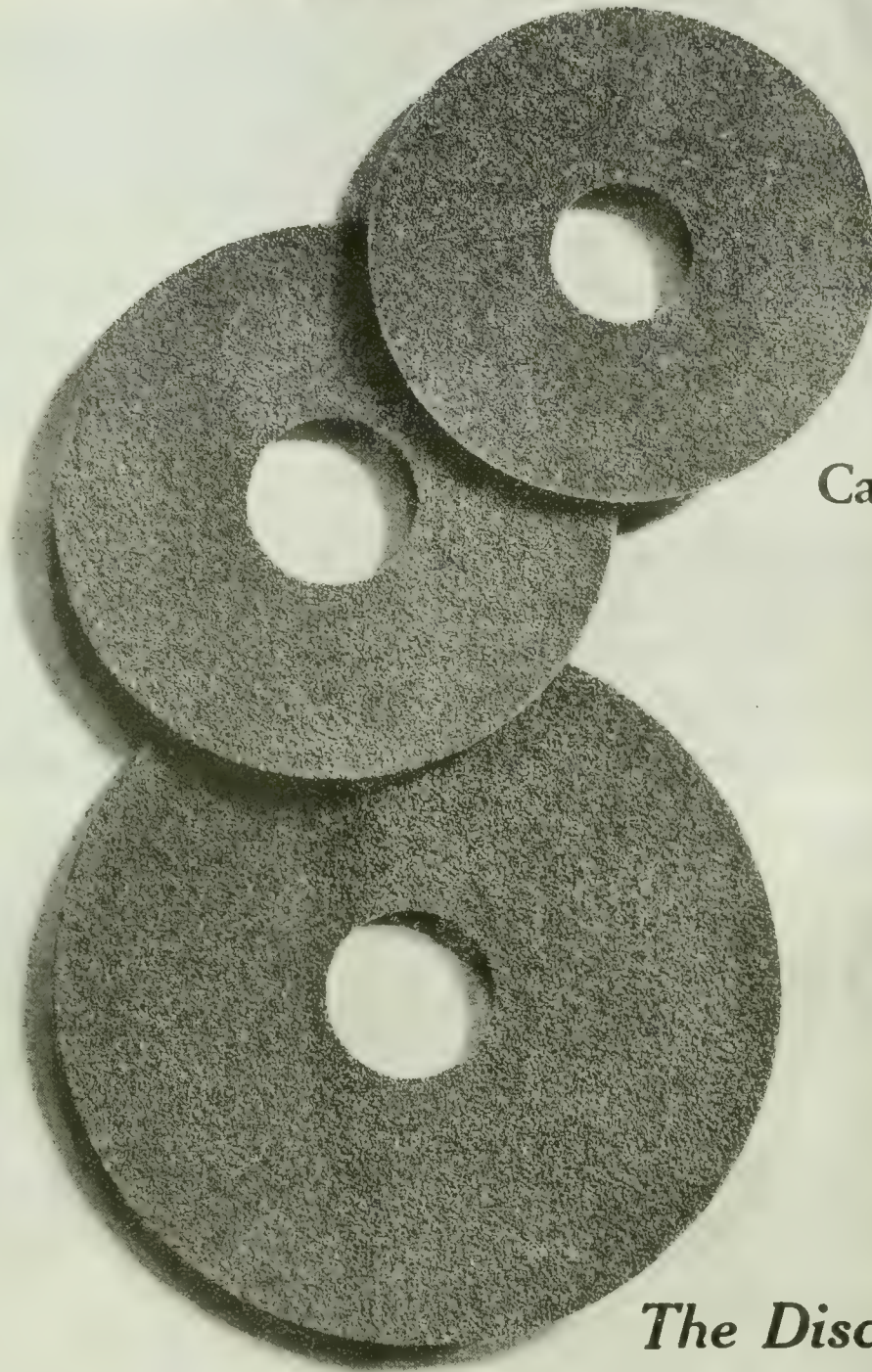


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Carborundum
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Discs

The Discs that Do

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For Your Particular Purpose

**To Increase Production — To Save on Disc Costs —
To Turn Out Better Work —**

YOU tell us what you are grinding and how you are doing it, and you will get a run of discs made to meet *your* grinding conditions—accurately graded to do *your* work. They will be discs that are open and free cutting—that wear right down to the fabric without glazing, standing up under the work with bulldog tenacity.

It's the way we make them—and what we make them of.

It is because of the hard, sharp, fast-cutting Carborundum and Aloxite grains and the high quality of cloth and glue. It is because of the care we use in making every disc fit to do its full duty.

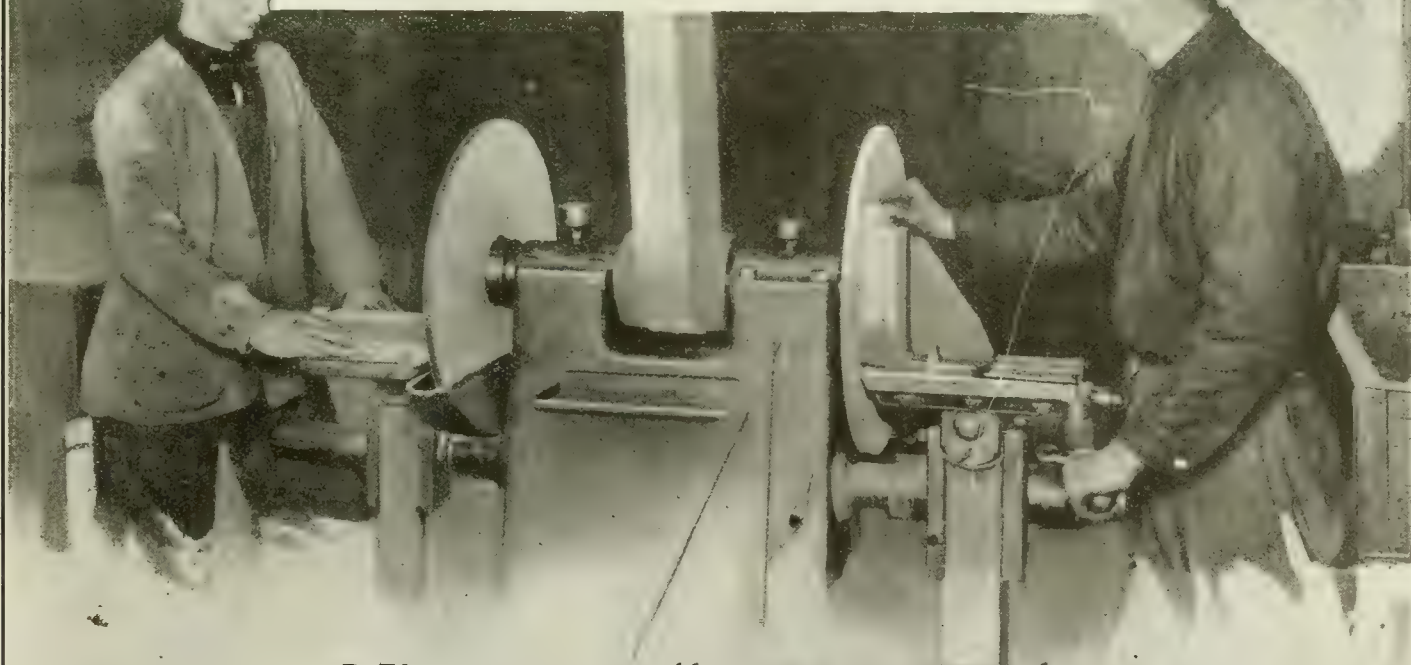
If you are grinding aluminum, brass, bronze or light cast iron—it is a Carborundum Disc you should use. For all kinds of steel, heavy snagging work or malleables—an Aloxite Disc. For heavy cast iron and mild steel—a Carboxite Disc.

Some of the biggest users of discs in the country are Carborundum customers. They are getting the results you can get with

The Discs that Do

Made in all grits, all sizes up to sixty inches, in four weights: light, regular, heavy and double coated.

Quick Deliveries? Certainly!



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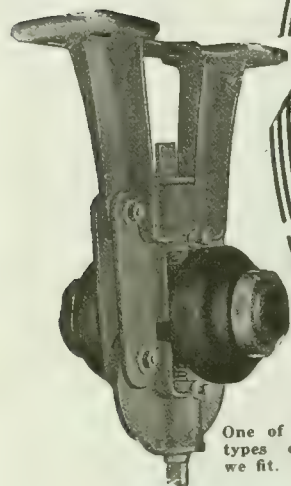
Chapman Double Ball Bearings

Pay You to Adopt Them

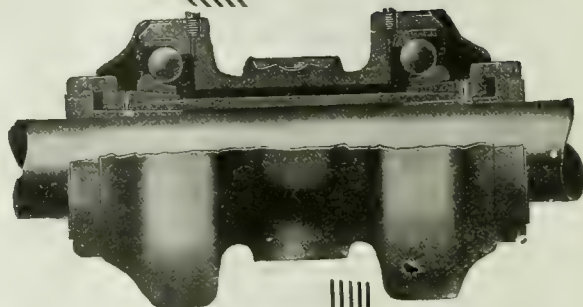
Are you using babbitted bearings in your power transmission machinery? The power you are losing through friction by their use would in two years' time pay for an installation of Chapman type of Ball Bearings. This is a fact proven by their installation in over 3,000 plants in Canada and United States. Chapman Double Ball Bearings practically eliminate friction, and they require lubrication only once or twice a year—therein lies the secret of their economy.

Chapman Double Ball Bearing Company of Canada, Ltd.

339-351 SORAUREN AVE., TORONTO
Room 408 Shaughnessy Bldg., Montreal; Trans-
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Military Rd., Buffalo, N.Y.



One of the many
types of frames
we fit.



Sectional view of
Chapman Double
row ball bearings.

Have you received a
copy of Catalog 3-G?
Pay to send for one
if you haven't.

Wherever Pipe is Cut or Threaded Economically

The probability is two to one that it's a

Williams Pipe Machine

that's on the job.

For in approximately two-thirds of all the larger plants in this country Williams' Pipe Machines are used.

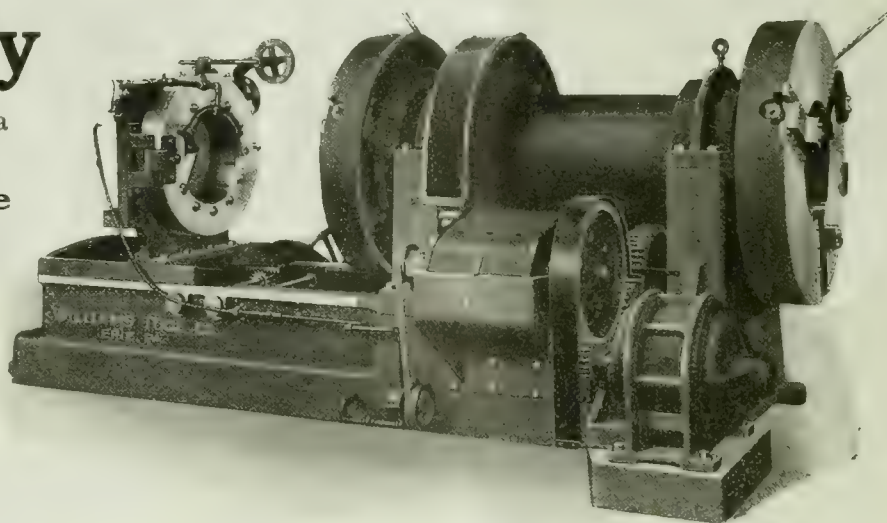
It was the Williams Pipe Machine that brought highest honors home from the Panama Exposition.

The Machine illustrated has a capacity of 21½" to 12". Also nine other sizes to meet your requirements.

Write

Williams Tool Company

Erie - Penn. - U.S.A.



Canadian Agents:

The A. R. Williams Machinery
Co., Ltd. Toronto Canada

European Agents:

Universal Machinery Corp.
London - England

This Tool

*was tested in a well-known
plant in New York*

It is a Davidsonized milling cutter, 4" diameter by $\frac{1}{2}$ " face. Run at a speed of 250 R.P.M., and with a feed of 7" per minute, taking a cut $\frac{1}{32}$ " wide by $\frac{1}{32}$ " deep, it worked without any difficulty for ONE HOUR AND THIRTY-TWO MINUTES.

As against this, a high-speed steel milling cutter of one of the best-known makes, and also a cutter made from one of the best-known high-speed steels, ran under the same conditions for TWENTY-EIGHT MINUTES. At the completion of the test the Davidsonized cutter was in better condition than either of the other two tools.

The material tested was .45% Carbon Open Hearth Steel, containing .70% Manganese.

*Name on request.



You Can't Get Away From Facts Like These

We claim that it is possible in a majority of instances to obtain similar results.

Davidsonized High Speed Steel

offers you great opportunities for increased production, long service and tool-making economy. We guarantee any tool of Davidsonized High Speed Steel to give you at least 10% better service than any other tool you have been using on corresponding work. You will be the sole judge. More and more of the leading machine shops are turning to this steel of remarkable service, because -

- (1) It increases production 10% or more. Such an increase, figuring factory overhead and labor, multiplies several times over the value of the tool.
- (2) The guarantee above gives absolute protection.
- (3) Davidson Special Service cuts tool-making time and tool-room costs.

SPECIAL SERVICE

We will supply Davidsonized Tools, semi-finished and easier to machine than any carbon tool steel, within approximately 1/64 of finish on face, 1/64 in bore and 1/32 in diameter, leaving only the final hardening and sharpening to be done in your tool room. A tool that takes 20 hours to make from the solid bar can easily be finished from a Davidsonized blank in about two hours. And we will guarantee our tools against breakage in hardening.

This service, though it applies also to standard tools, is especially desirable in the case of tools made to unusual shapes and other specifications.

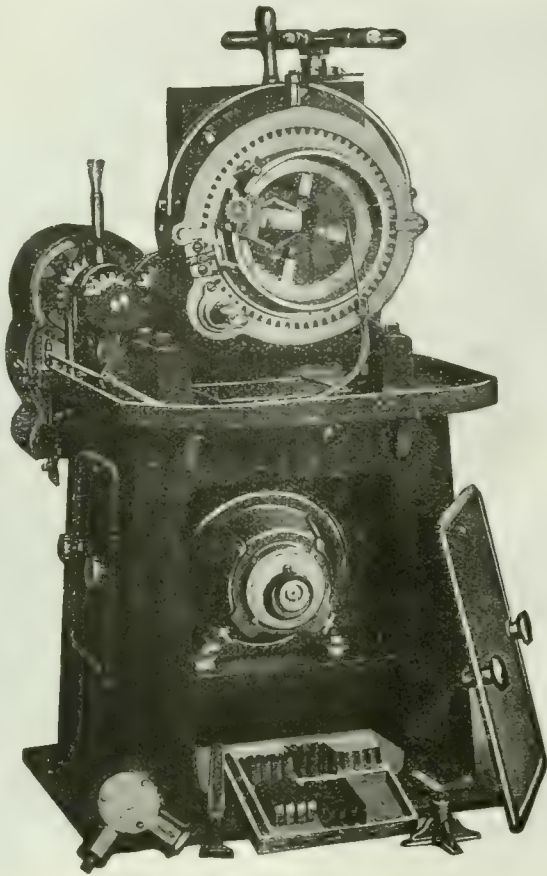
Use this special service. It costs you less than to bring your tools from the bar to the stage at which we furnish them. It eliminates the loss of breakage in hardening. And, most important of all, it gives you better tools than you have been using, tools capable of such performances as the one described above, tools that will boost your production and give you longer service. Send us a trial order; our guarantee prevents all risk. Correspondence invited.

THE DAVIDSON TOOL MFG. CORPORATION

Head Offices: 118-122 Maiden Lane, N.Y., Works: 56-62 North 6th St., Brooklyn, N.Y.

THE CANADIAN FAIRBANKS-MORSE CO., LIMITED

Halifax, St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Vancouver, Victoria



“Forbes Facts”

1. One man can do the work of six against the old stock and die method of cutting.
2. It is the only machine on the market with receding gear.
3. It is self-contained and motor-driven.
4. It is portable.

These are convincing arguments for the construction and utility of this machine. Thread cutting can be performed fast, clean and true. Equipped with self-centering vise.

The Curtis & Curtis Co.
115 Garden Street Bridgeport, Conn.

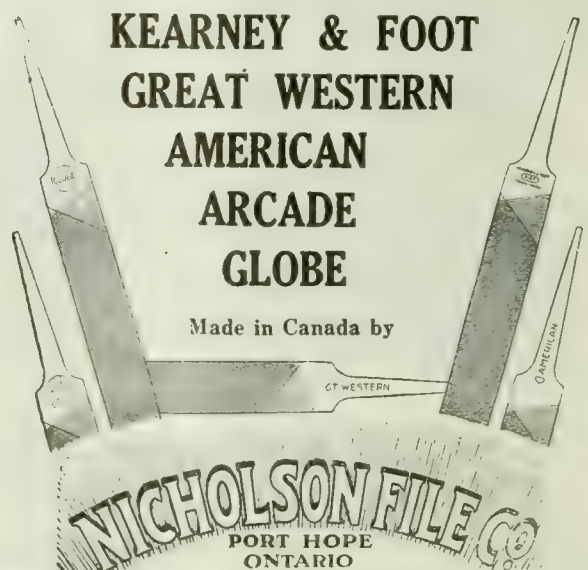
AWAY WITH DULL FILES

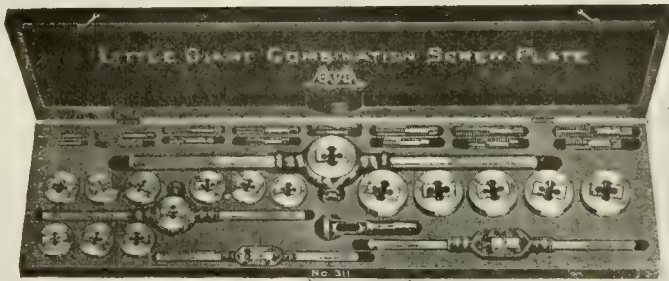
One hour's work with a dull file will cost you more in wasted labour than a new file.

Tell your men, therefore, to turn in files the moment they have passed their efficient point.

But to get files that give the longest efficiency, specify “Famous Five” when you order.

They Are:





93

A Pointer

Poor tools or lack of tools is the greatest hindrance the repair man has. The novice with an assortment of good tools can accomplish more.

No shop equipment is complete without a GTD Screw Plate. Not only will it recut jammed threads, but new threaded parts can be made—and it's mighty hard to get spare parts nowadays.

GTD Screw Plates are made in over a hundred assortments. Yours is among them.

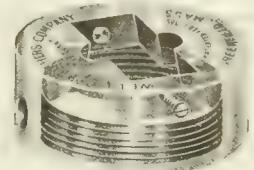
Write for New Small Tools Catalog No. 40 describing Screw Plates, Taps, Dies, Reamers, etc.

WELLS BROTHERS COMPANY of Canada, Ltd.

GALT

ONTARIO

Canadian Factory of the
GREENFIELD TAP AND DIE CORPORATION



Cap for Little Giant Collet, showing Adjusting Screws.



Little Giant Die

Buy a

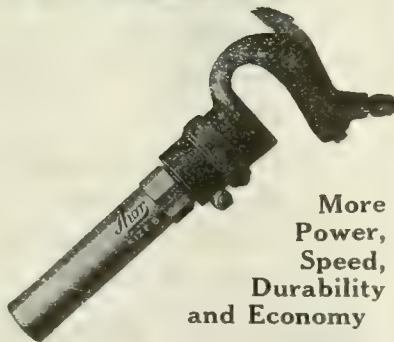
GTD Screw Plate

with Little Giant Adjustable Reversible Dies

One Thor—
More Thors

Thor

New Pistol Grip
Chipping,
Calking
and Flue
Beading
Hammers.
Single Valve.
No Vibration.



More
Power,
Speed,
Durability
and Economy

Independent Pneumatic Tool Co.
334 St. James St., MONTREAL, QUE.

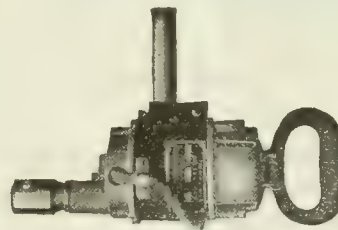
Toronto: 32 Front St. W.

Winnipeg: 123 Bannatyne Ave., E.

Vancouver: 1142 Homer St.

U. S. Electric Drills and Grinders

Save Time. Labor and Money



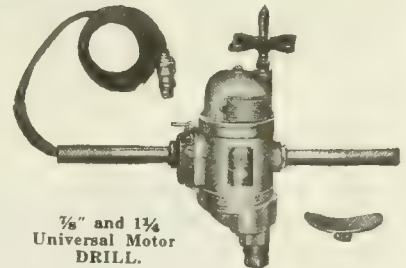
3 SIZES

3-16 in., W.G.T., 6 lbs.
1/4 in., W.G.T., 9 lbs.
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All motors wound for
110 or 220 volts.

Direct or alternating
current.

Try a few of our
Electric Drills and
Grinders and you'll
send us an order for
more. Our guaran-
tee protects you.



7/8" and 1 1/4"
Universal Motor
DRILL.

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The Canadian Fairbanks-Morse Co., Limited
Montreal, St. John, N.B., Toronto, Winnipeg, Calgary,
Vancouver

THE UNITED STATES ELECTRICAL TOOL CO.
CINCINNATI, OHIO

Notes on Grinding

NORTON COMPANY,
WORCESTER, MASS.

No. 21A

The Use of Hard Wheels

Log conditions vary with the seasons. In the winter the logs are frozen or ice-covered; in the spring the bark is full of dirt, mud and grit, which cannot be entirely removed by flushing with a hose or rolling around in the pond. All the year trouble is usually experienced from iron in the form of nails, spikes and bolts which have been driven into the logs at various times. Stones are frequently picked up in the bark and completely covered over in a few years.

When a saw runs into iron or stones, anything is likely to happen, from the mere dulling of the points of the teeth to completely stripping away the teeth and perhaps tearing the whole saw to pieces. The amount of grinding is necessarily proportional to the condition in which the saws came back to the file room. With knocked-off points and stripped teeth, several hours of exceedingly hard grinding may be necessary. This is hard on the wheel, which may wear down in a few hours of this strenuous work as much as several weeks of ordinary grinding. For an occasion like this the careful grinder uses the wheels which he has found are too hard for the general run of work. These harder wheels will stand up and hold their shape much better than can be expected of the regular wheels.

As you were reading the above, perhaps some grinding problem in connection with your saw sharpening occurred to you. The Norton Sales Engineering Department stands ready to help you solve this problem. Why not put it up to them?

NORTON COMPANY

NEW YORK STORE

CHICAGO STORE

151 CHAMBERS ST.

11 NO. JEFFERSON ST.

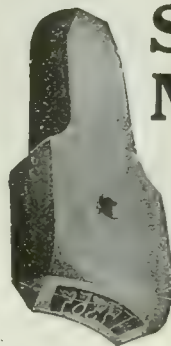
ELECTRIC FURNACE PLANTS

NIAGARA FALLS, N.Y.

CHIPPAWA, ONT.

Canadian Agents:—The Canadian Fairbanks-Morse Co., Ltd., Montreal, Toronto, Ottawa, St. John, N.B., Winnipeg, Calgary, Saskatoon, Vancouver, Victoria. F. H. Andrews & Son, Quebec, Que.

Grinding Wheel Plants, Worcester, Mass.

ELECTRIC FURNACE PLANTS
NIAGARA FALLS, N.Y. CHIPPAWA, ONT.NEW YORK STORE CHICAGO STORE
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Simplified Marking!

Canadian munition plants who have adopted Matthews Marking Tools find their marking operations simplified, done better and at a reduced cost.

MATTHEWS' Improved Champion Steel Holders and Interchangeable Grooved Type are designed to simplify and cut the cost of interchangeable marking. Strong spring attachment of holder and grooved type keep letters and figures secure and assures accurate, straight line work. MATTHEWS' line of marking tools meet all your requirements. Send for catalog.

Canadian Fairbanks-Morse Co., Ltd.

Montreal, Toronto, St. John, Quebec, Ottawa, Hamilton,
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Victoria.

Jas. H. Matthews & Co. - Pittsburgh, Pa.

Steel Lettering Dies and Stamps



Reg. U.S. Pat. Office.

"METALWOOD"

Hydraulic and Hydro-Pneumatic Quick Operating Presses for Straightening, Forcing and Broaching operations.

Hydraulic Accumulator Systems complete; Pumps, Valves, Forged Steel High Pressure Fittings, etc.

Metalwood Manufacturing Co.

Detroit, Michigan

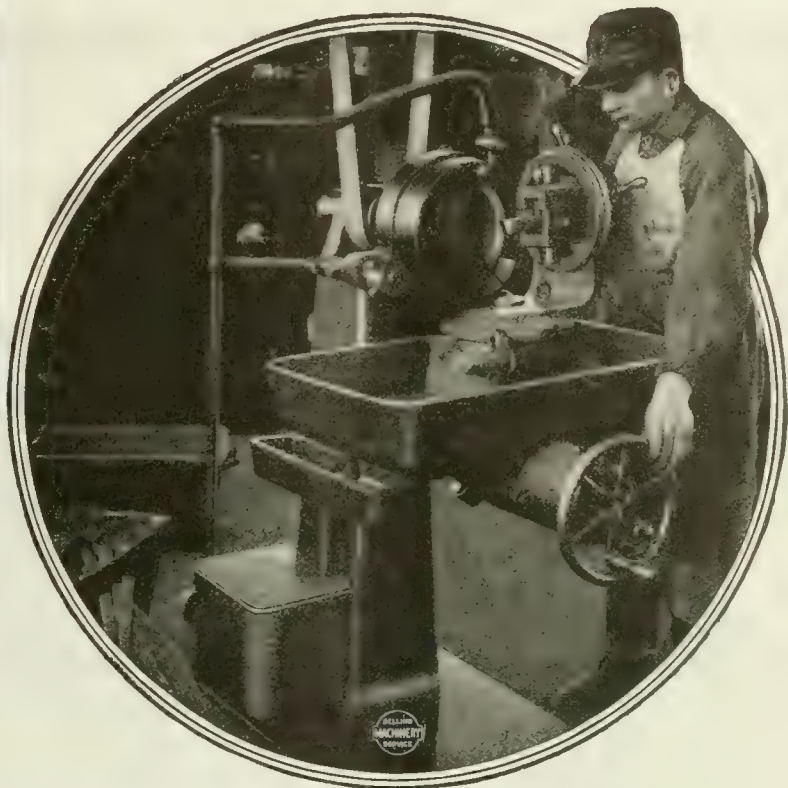
Sales Representatives

Canadian Fairbanks-Morse Co., Ltd., Montreal and Toronto;
R. E. Ellis Engineering Co., 621 Washington Blvd., Chicago;
Fairbanks-Morse & Co., Inc., 30 Church St., New York City;
Sherritt & Stoer Co., Inc., Finance Bldg., Philadelphia, Pa.

The Old Emery Stand Breeds Industrial Slackers



**But—
A Boy and a Gisholt
Will Put Them to
Work**



This is no time for slackers; in army or shop. Then why give space to anything that invites idleness?

Gisholt Tool Grinders are good recruiting agents. With a Gisholt on the job your machine tool operators stay on the job and thus add valuable productive working minutes to their time and the turning time of their machines.

Sharp tools all the time, busy men all the time, busy machines all the time—that's the Gisholt method.

Isn't it worth looking into?

Gisholt Machine Co. - Madison, Wis., U.S.A.


*Builders of Standard and Automatic Turret Lathes, Vertical and Horizontal Boring Mills,
Tool Grinders, Small Tools, Special Machinery*

*Canadian Agents: The Canadian Fairbanks-Morse Co., Ltd., St. John, Quebec, Montreal, Ottawa,
Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria*

THE CANADIAN
Fairbanks-Morse
EVERYTHING MECHANICAL

Fairbanks Scales

The World's Standard for over 90 years---
The Scales that made weighing
accurate---For every weighing
requirement.

Engines **Pumps**
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Our stocks are the largest in Canada

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CANADIAN MACHINERY

AND MANUFACTURING NEWS

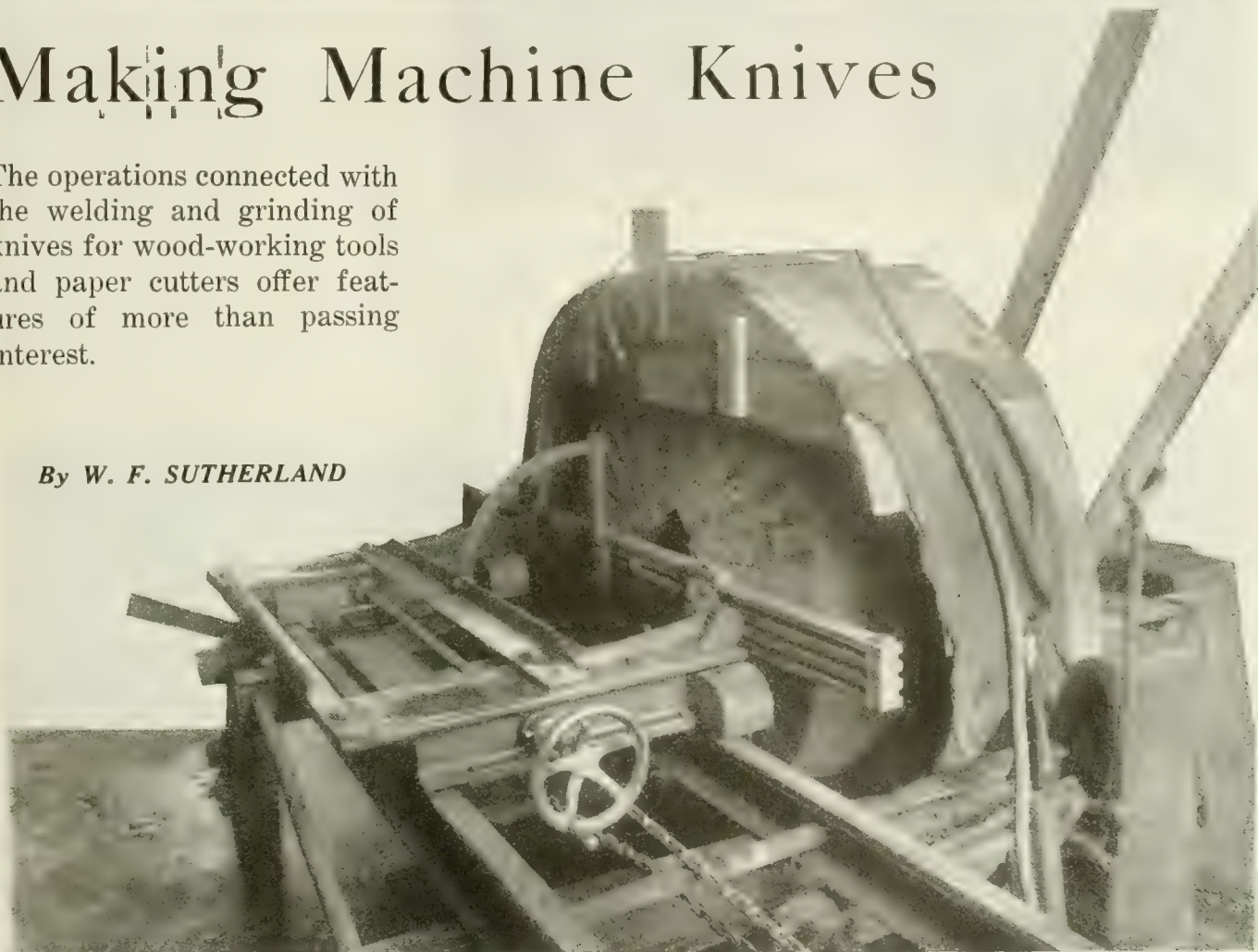
Volume XXI. No. 4.

January 23, 1919

Making Machine Knives

The operations connected with the welding and grinding of knives for wood-working tools and paper cutters offer features of more than passing interest.

By W. F. SUTHERLAND



FROM the exquisite weapons and implements of the bronze age to the modern cutting tools of to-day is indeed a far cry, but the skill of the craftsman is as evident now as then. Bronze knives, axes and other weapons, dug up after countless years in the earth, excite to-day the admiration of those who appreciate beauty of form. The day of quantity production and fine limits requires equal skill in those who fashion the tools of modern industry. Careful workmanship and skill are now apparent in the length of life and performance of the knives and other cutting mediums of the present day.

The manufacture of machine knives, cutters and shear blades as carried on

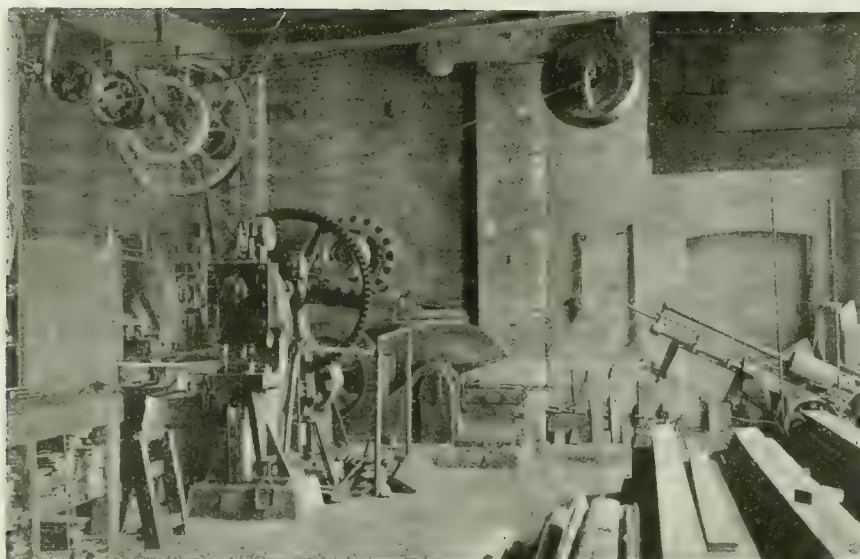
by the Galt Knife Co., Ltd., is an excellent example of an industry where acquired skill is of great importance. Machine knives for the woodworking, paper and veneer trades, special cutter heads and shear blades for metal power shears are made from Sheffield crucible, or high speed steel, and throughout the process experienced men have been found essential to the securing of a high quality in the finished product.

Materials Used

For the cutting edge of planer, paper cutting and veneer knives Sheffield crucible steel is used, welded on a body of dead soft open hearth steel. This latter is a very low carbon steel well adapted to

welding. For the formed cutters for stickers, shapers and other woodworking tools, crucible steel is used throughout. High speed steel is used when required for the round cylinders of the later makes of wood-working tools, such as planers and jointers.

Stock bars are taken from the stock room and cut to approximately the correct length in a pair of alligator shears made by the Canton Foundry and Machine Co. Bars which are too large to be sheared are sawn in an Acme metal sawing machine of English make. This machine cuts on the return stroke and can be run at three speeds—130, 90, or 60 strokes per min. For cutting the soft steel 130 strokes per minute are used,



STOCK ROOM AND PUNCH, SHEARS AND METAL SAW

while for the crucible steel shapes for the cutting edge 60 strokes per minute have been found to give the best results.

Welding

The crucible steel and mild steel backing are then taken to the forge shop for welding.

It is here that skill has been found essential to success. It may be imagined that to make a perfect weld two or more inches wide and perhaps 8 ft. long between the two steel parts of each knife is no mean task. The welding faces of the cutting edge and back are carefully ground to remove every particle of scale and are then heated in a furnace to the welding temperature. This furnace is in two parts, the rear portion being used for preheating the shorter lengths, while for the long knives it is made part of the main furnace. The furnace has been made by the company and a high grade of coke is used for fuel. A flux is used in the welding operation, gun barrel borings and borax being used with good results.

The bar of soft steel is double the width approximately of the finished knife and the crucible steel cutting edge also double the required width is welded down the centre of the soft steel bar. The weld is first tacked on a power hammer and is then passed through the 9-in. welding rolls shown, which were also made in the plant. It will be noticed that there is a V shaped projection on the upper roll. This serves to separate the bar into two halves, each one having the crucible steel edge welded in. This V also serves to bevel the edge and eliminates much of the grinding which would be otherwise necessary. The finished welded bar is shown beside the rolls as it comes from the machine parted into two pieces.

Machining

After the welding operation the blanks are trimmed to the proper length and the slots then punched out considerably smaller than the finished slot. The

next step is the tempering, which is carried out in the forge room—both oil and water baths are used. The oil tank being mounted on a truck is readily moved to any required location.

The water bath is contained in a reinforced concrete tank, the walls of which are 4 in. thick. Water-tightness is secured by a coating of Keene's cement and no seepage has ever been noticed. Several ovens of various sizes are used and one tempering fire will take in a piece 8 ft. long. Anthracite pea coal is used for fuel. The forge shop equipment includes a 1,000-lb. Canada Machinery drop forge and a forging hammer by Beaudry of Boston.

Rough Grinding

After being tempered the knives are rough ground and bevelled. The frames which do this work are large enough to take in stones 6 ft. by 14 in. face. These stones are used in the rough grinding frames until worn down to 40 in. diameter and are then placed in the face grinder, where they are used until worn down to 6 in. thick. After this they serve yet another useful purpose, for they are then placed in another frame and used until nothing but the hole remains.

The frames used in the grinding room were all made in the factory and contain a number of features of rather more than usual interest. The face grinder shown has a cup chuck in which the wheels are fastened by jaws and wedges. The feed mechanism is an ingenious bit of

mechanism. A belted feed shaft carries a spur gear, which engages with an internal and spur gear alternately on the feed mechanism.

Proper clearance is provided between the spur gear and the internal gear so that the driving pinion engages with only one of them at a time. By means of a hand lever the pinion is shifted from the internal gear to the spur gear, as it is desired to reverse the travel of table. This arrangement gives a slow working traverse of the table and a rapid return stroke.

The other frames shown are fitted with a slightly different arrangement. It is here necessary to use a level gear as the direction of traverse is across the face of the wheel. Advantage is taken of this fact and two level gears alternately engage on either side of a level driving pinion. A hand lever here also controls the direction of the table traverse.

The table runs on two rails and the feed mechanism is attached to it by means of an endless chain working on a feed roller of 3 in. pipe mounted on the feed shaft.

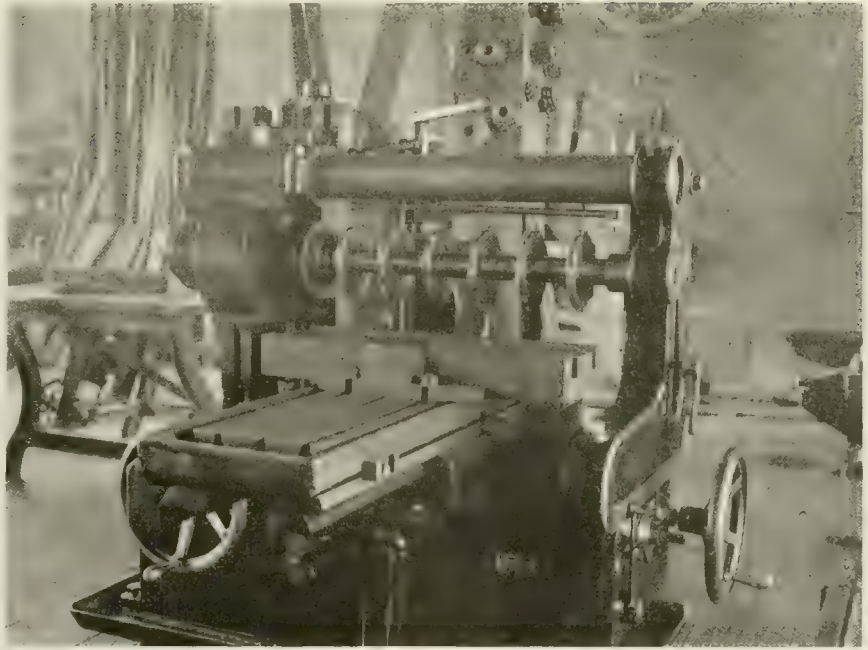
The wheels used are of a high quality natural grit and have to be tempered or left to age until the natural moisture has evaporated.



1,000 DROP HAMMER

Milling the Slot

The next step is the accurate milling out of the slot to the required size and spacing. A 26-in. Kempsmith milling machine, Lincoln type, is used for this operation. This machine is shown in one of the illustrations and a close up view of one of the cutters is also illustrated. This cutter is somewhat novel in design and is made up of a mild steel body with inserted blades of high speed steel. Dovetailed slots are milled in the body and are carried slightly past the centre line of the cutter. The slots are cut alternately on each face of the body and the bits are driven home in the slots to a firm bearing, after which they are ground to the proper cutting contour. Hardened steel bushings are used to space the cutters at the proper centering. The milling of the bolting slots after hardening and tempering eliminates any variation which might be experienced through the change in length produced by the hardening. This sequence is rendered possible by the use of mild steel for the body of the knife.



KEMPSMITH MILLER SET UP FOR SLOTTING KNIVES

Edging and Finishing

The final sharpening or edging of the knife is done on a Bridgeport Emery Wheel Co. machine. This grinder will grind a knife 100 in. long and a carborundum cup wheel is used. The knives

are finally ground on the back and carefully balanced. The necessity for balancing the knives belonging to a set where two or more are used in a planer head is very apparent, for a small cut

of balanced mass would result in a serious vibration at the high speeds employed.

The welded type of knife is also adaptable to other than the flat knives,



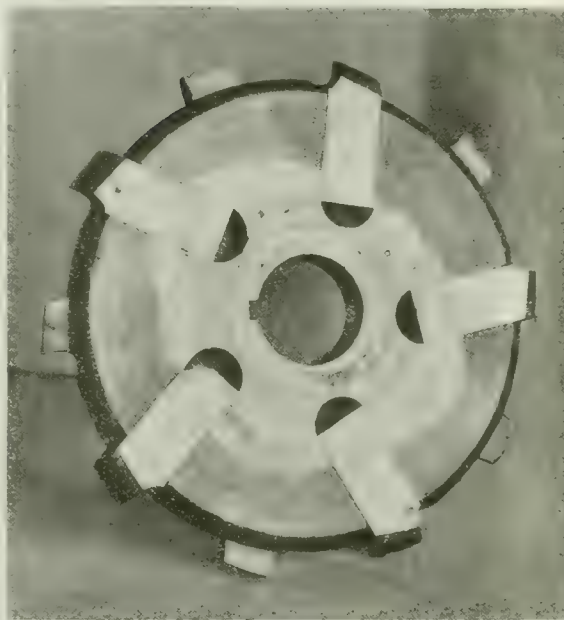
WELDING ROLLS NOTE THE "V" WHICH PARTS THE BAR AT THE CENTRE AND ASSISTS IN WELDING

curved knives can readily be fashioned to template; in this case grinding has to be accomplished by hand. Much of this work has to be done and four stands are provided, three of Ford-Smith make and the other by the Perfect Machinery Co. No one type of wheel is used, several makes being used as occasion requires.

Wood milling cutters for shaper spindles are made of crucible steel, the stock being sawn to length, turned, bored, and milled. A McDougall lathe, 16 in. swing is used for the relieving of all cutters. A special relieving attachment permits the relieving of cutters of from 2 to 30 teeth, if desired. The slots in milling cutters are drilled out and the slots in the Kempsmith miller.

A Mackenzie shaper and a McDougal 24 in. by 8 ft. planer form part of the well-equipped machine shop. A Barnes drill and Racine back-saw are also found.

During the war hacksaw blades were almost impossible to obtain and a saw sharpener was installed. This machine, made by the Wardell Mfg. Co., Cleveland, automatically sharpens the saw



TYPE OF CUTTER USED IN SLOTTING KNIVES

when once started. An ebonite wheel, 1-16 in. thick, is used and tilted at such an angle that the cutting rake of the teeth is preserved. A cam provides means for gradually raising the wheel

ashes as the tooth is sharpened and dogs provide means whereby the teeth are automatically advanced into position.

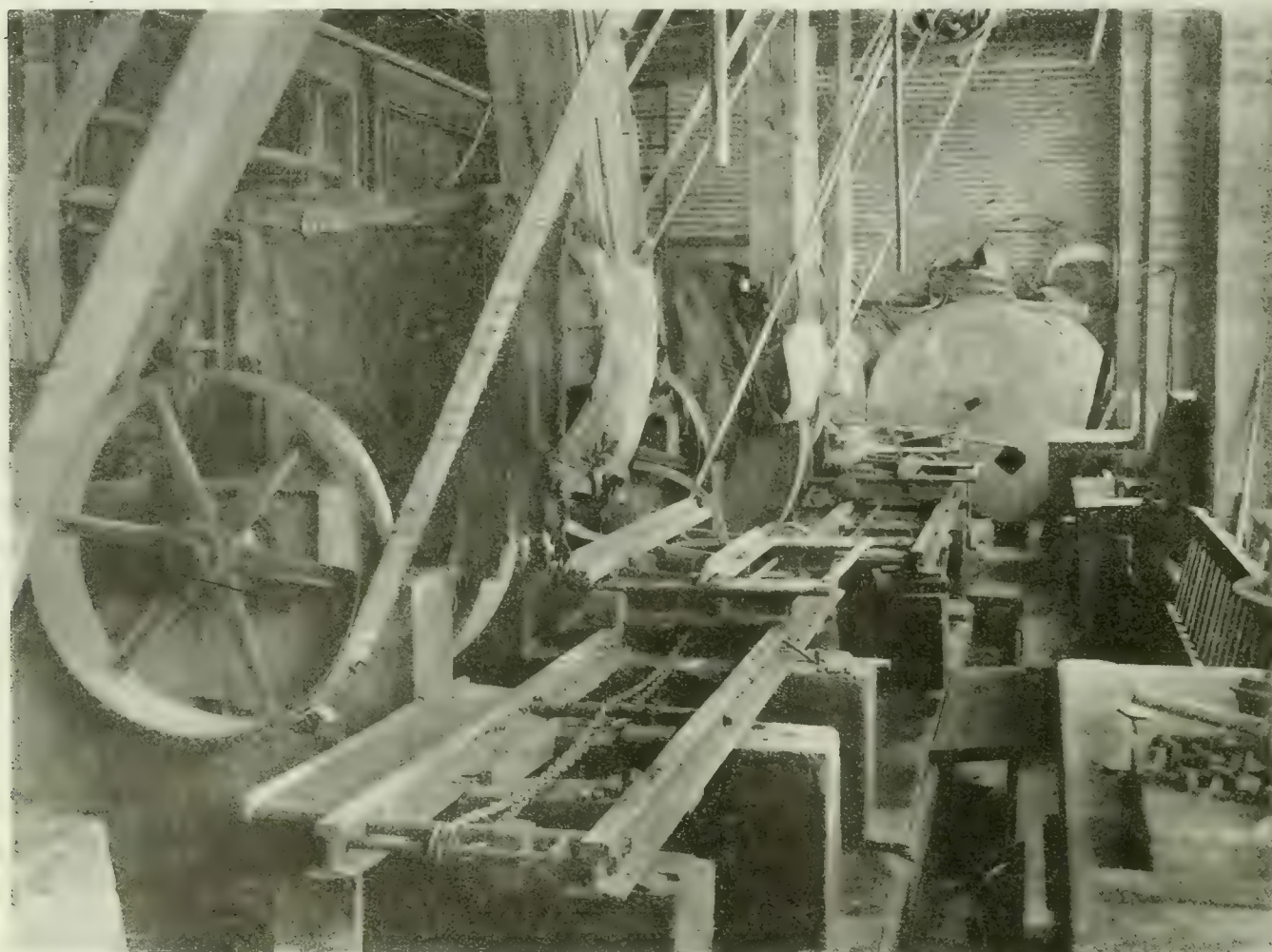
War Developments

The war came at a most inopportune time for the Galt Knife Co., as the firm had only been started, July, 1914, and the advent of war conditions necessarily threw the furniture and wood-working businesses out of joint. These trades are perhaps the greatest users of the various types of knives made, and the loss of their business was of no small consequence. However, the munition business offered an attractive field and work was actively started on forging of shell plugs and sockets, brass being the material then used.

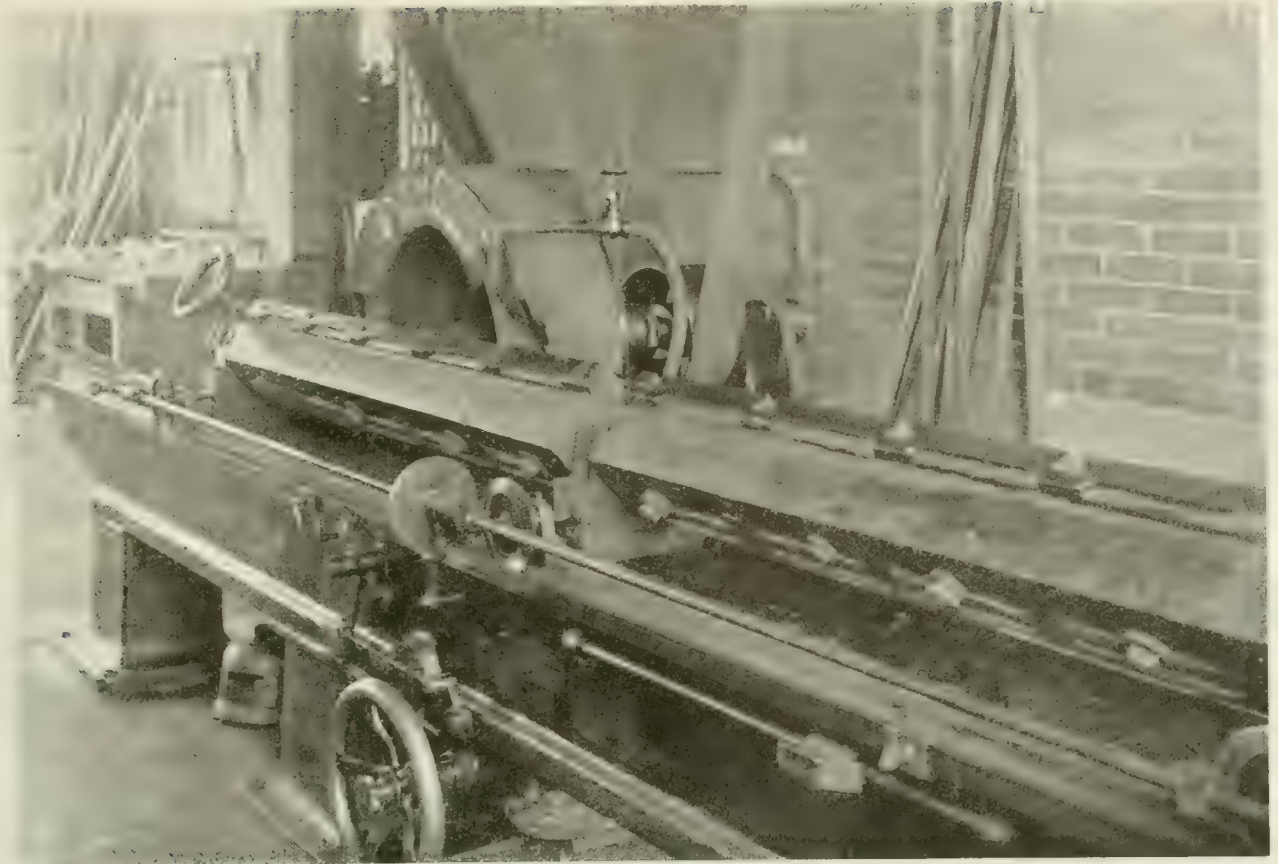
With the enormous expansion of the shell industry, shell boring cutters and formed tools were in great demand. The experience of this firm in the use of the Sheffield steel and high speed steel enabled them, with the plant on hand, to turn out cutters in such quantities as to be a material factor in the tooling up of Canadian munition shops.

Personnel

The Galt Knife Co., as before men-



VIEW IN GRINDING ROOM, SHOWING EDGING GRINDERS.



BRIDGEPORT EMERY WHEEL CO. GRINDER USED IN EDGING KNIVES

tioned, was started in July, 1914, by Thomas Vair and son, Ward Vair. The measure of success which has attended their efforts is due in no small measure to the past experience both the founders gained during many years of active management in industries of like nature.

The Return of Peace

One kind of business makes another, and if people need furniture, if soldiers need clothes, and all of us need food, as it is certain we do—furniture makers, the clothing trade, the agricultural interest, and others of our more or less basic industries are going to call in the machine shop to their assistance. Ward Vair is optimistic as to the probable effects of the return of peace upon our manufacturing interests.

The wood-working industry has been pretty well demoralized during the past few years and many of the planing mills and furniture factories had been closed up tight until peace conditions returned. Stocks have now been depleted and many factories have no stock whatever on hand.

When orders start coming in, equipment will have to be purchased to take care of it. All this you may say is dependent upon the probability of orders being received, but in this connection it must be remembered that our returning army, far from being a liability, will likely prove to be an asset in our business life. Take for instance the one item of civilian clothes. The Government allowance granted the soldier for

his purchase of civics is thirty-five dollars and at a conservative estimate of 300,000 men this will result in a business of \$10,500,000 for the clothing trade alone.

Other lines of business will profit in like fashion, particularly the agricultural industry of Canada, which, needless to say, is in expectation of extremely profitable returns for its labor during the next few years.

All industry, no matter of whatever kind, is in the last analysis dependent upon the machine shops, foundry and other metal-working trades for its existence.

Modern agriculture is becoming increasingly dependent upon labor-saving devices for its existence, and everything that finds a place in the furnishing of the home, the clothing we wear, or the food we eat is fashioned in some measure with the aid of the products of the machine shop.

SMOKE AN EXPENSIVE NUISANCE

The black, opaque smoke that is often given off by the chimneys of boiler plants consists largely of myriads of little particles of unconsumed carbon, together with volatile and condensable tarry matters that are distilled from the coal by the heat, and which are passing away unburned. Cindery particles of coal or coke of tangible size may also be present in vast numbers. The production of

black smoke is a sure sign of imperfect combustion, and the owners of plants that produce it in huge volumes should remember that such smoke is an expensive nuisance, and they should take strenuous measures to abolish it, in the interest of their own pocketbooks. The light, grayish clouds that are often seen about the top of a chimney are of no especial significance as they consist mainly of condensed water-vapor. Screens, ruled with graduated black lines, may be had for estimating the density of smoke, and the use of these screens often leads to a material improvement in the combustion.

Numerous special devices may be had for "burning" the smoke, or lessening its production; but although some of these are doubtless effective, it must nevertheless be admitted that none of them gives an ideal solution of the problem, because the cost of reducing the smoke by blowing air or steam into the furnace is likely to be fully as great as the saving that results from the consequent improvement in the combustion. The prevailing opinion among engineers is to the effect that "the best smoke consumer is a good fireman"—which means that by careful management under the guidance of an intelligent and skilful man, the combustion can be carried out well enough to avoid the production of black smoke in any considerable quantity. This is true only to a certain extent, however, for although the good fireman is without doubt a highly important element, the most essential feature of all is a properly designed furnace.

Making Milling and Gear Cutting Attachment—II

In This Article is Described the Making of an Attachment For Lathes Which Performs Milling and Gear Cutting Operations—Various Tools and Operations Used in Machining Are Shown

By ROBERT MAWSON

IN this article, which is the second of the series, other tools and methods are described as used by the Presto Machine Co., Inc., Brooklyn, N.Y., when manufacturing a milling and gear-cutting attachment. The object of the tools is for intensive and accurate production and the results are proving satisfactory. Particular attention might be called to the marking machine which is used for graduating the dividing head base. This is of special design and is simple in operation, accurate in results and is practically fool proof.

The overhanging arm supports the cutter arbor, which is driven by the gears housed in the cutter block.

The first operation when machining this arm is turning the shank A—Fig. 1.

This operation is performed in a lathe with the tail stock centre setting in the centre B, the boss on the casting being provided for that purpose. The turned surface is afterwards ground .1250 inches.

The arm is then placed on the jig shown, being located by a vee block and held with the strap C.

A hole is then drilled and reamed to 0.562 in., the tools being guided through the bushing D.

Machining the Vertical Column

A view of one of the vertical columns before machining is shown in Fig. 2 and the various operations followed will be described in their sequence.

The first operation is shaping the base, which is performed in the fixture Fig. 3. The casting is located between pins A and rests on pads at the rear and front ends.

The screw B when tightened forces the piece back against a stop and the four straps shown hold it against the cutting stresses exerted by the shaping tool.

With the fixture and casting located and held on the shaper table the base C is then machined.

The next operation is machining the

dovetail, and the fixture used is shown in Fig. 4. The casting again rests on locating pads and the various screws shown being tightened hold it securely in the fixture.

The two dovetails are then machined each with an angle of 30 degrees.

The machined surfaces are then scraped to a gauge to ensure both smoothness and accuracy in shape.

The casting is next placed in the fixture Fig. 5, being located by the machined dovetail A, the receiving surface of the tool being an accurate fit for the same. The piece is then pushed back against a locating pad at the rear of the fixture.

The screws B when tightened down hold the casting securely in the fixture. This is located by tongues on the milling machine table so that the surface of the boss will be machined squarely.

The casting being fed across the face of the revolving cutter C the face of the boss for the base binder is machined.

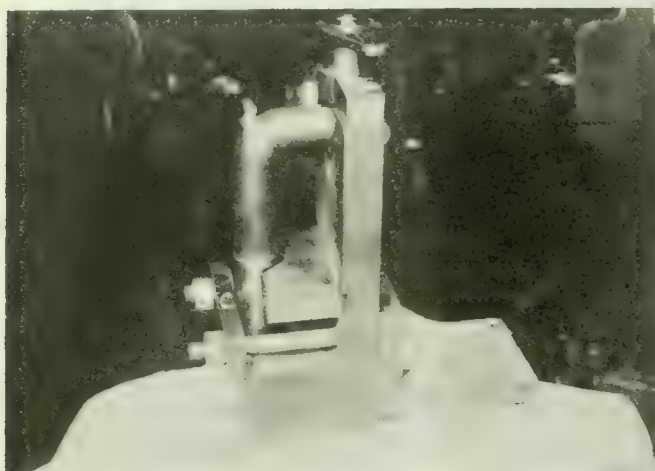


FIG. 1—DRILLING THE OVERHANGING ARM.

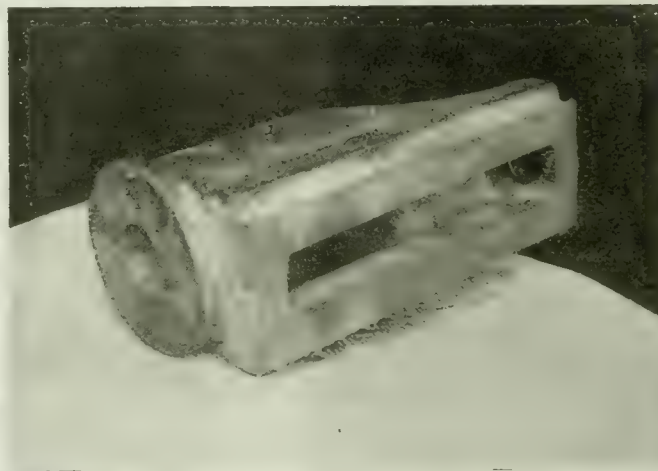


FIG. 2 UNFINISHED CASTING, VERTICAL COLUMN.

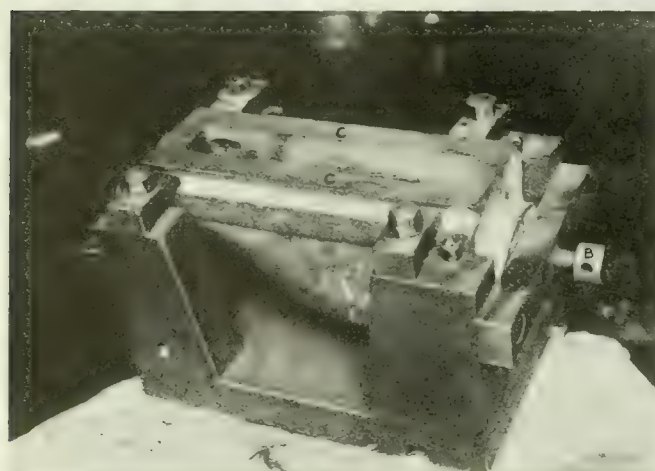


FIG. 3—SHAPING THE BASE.

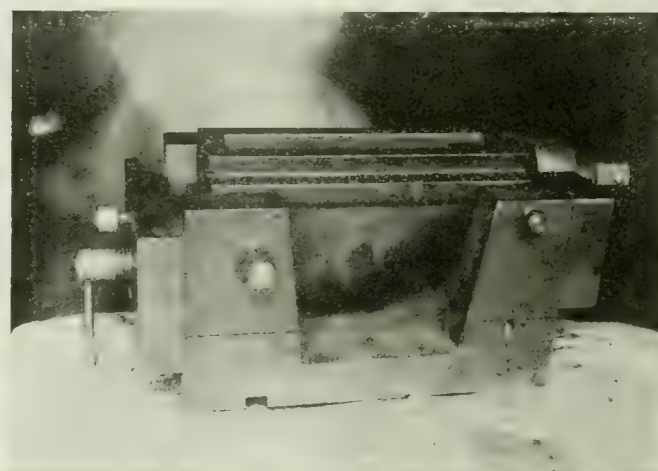


FIG. 4 MACHINING THE DOVETAIL.

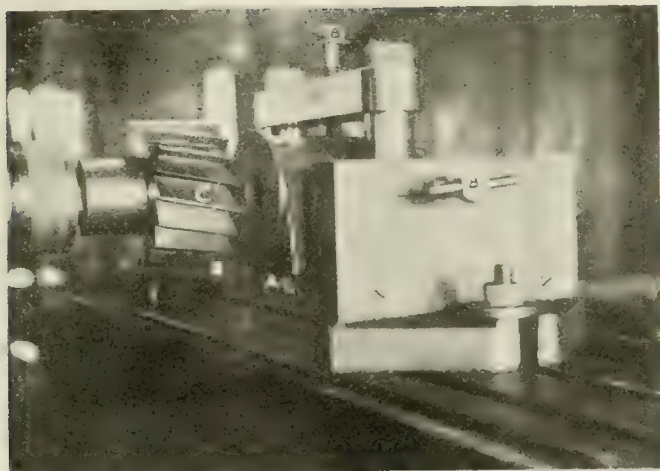


FIG. 5 FACING BASE OF COLUMN.

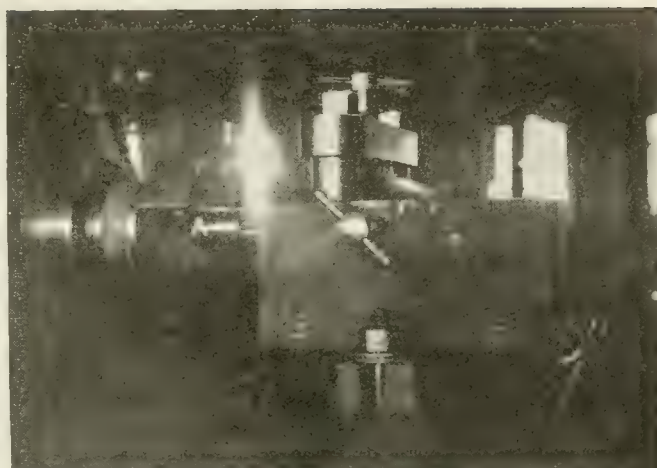


FIG. 6—TURNING THE BOSS.

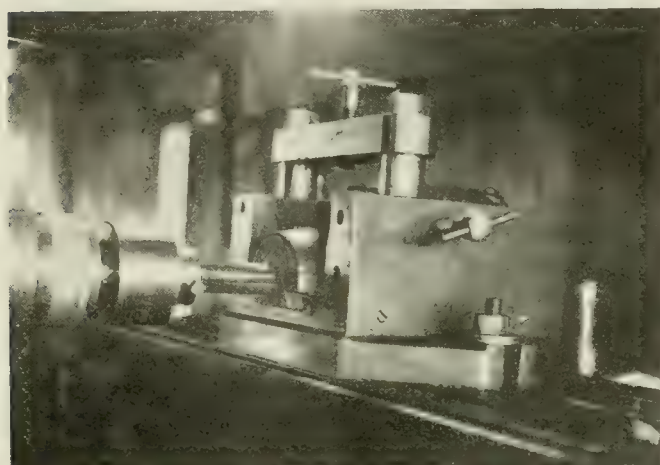


FIG. 7—DRILLING, FACING AND TAPPING.



FIG. 8—MILLING THE KEYWAY

The end mill is then removed and the inserted tooth cutter A, Fig. 6, is attached to the milling machine spindle.

This tool, it will be noticed, is a combination boring and turning tool and is used to first bore out the hole. After this is accomplished the boring tool is made with a straight shank; this acts as a pilot for the turning operation. The tool is used as follows: the table is set to the correct height and then fed in against the revolving boring tool. The feed or travel is continued until the outside of the boss is turned to the diameter between the cutting edges of the two inserted blades shown, which is 1.375 in.

It will be noticed that these blades can be adjusted, being held with two set screws.

The fixture is then turned around 180 deg. on the milling machine table to the position shown in Fig. 7. A hole is then drilled in the boss which is tapped out with 1 in. x 6 threads as shown in the illustration. It will be thus seen that this fixture is used for facing, boring and turning the boss at one end, and drilling and tapping the boss on the opposite end. A number of holes with 5-16-18 threads are then drilled, no jig being however used, the holes being spotted in the centre of the various bosses.

The casting is next placed on the fixture, Fig. 8, being located by the dovetail surfaces sliding on from the end of the fixture. A Woodruff keyway is then machined at the upper end of the bored hole.

One of the finished machined castings is shown in Fig. 9, and the various steps observed in manufacture may be followed.

Machining the Dividing Head Base

The vertical column is mounted on a base known as the dividing head base. One of these, as received from the foundry, is shown in Fig. 10.

The first operation is milling the vees in the fixture, Fig. 11.

The casting is placed on height pins and fits under a ledge of the fixture along the surface A.

The two clamps B force the casting into this ledge and also tend to hold it down.

A pair of gang cutters accurately spaced is then used to machine the two vee surfaces shown.

The surfaces machined are at 45 deg. or an included angle of 90 degrees.

In Fig. 12 is shown the casting mounted on a lathe face plate for the next operation, which is facing, turning the 1.374 in. boss, boring and countersinking a 0.4375 in. hole and bevelling a 60

deg. surface for the graduations.

The casting is located against three stop plates A and held down with four c'amps as shown.

When performing the operations noted on the casting the tool illustrated in Fig. 13 is used. This tool is carried in the lathe tool post at an angle, so that the end of the 1.374 in. boss is first faced, using a stop in the cross slide for the correct diameter.

The diameter is then turned, also using a stop for the correct height of boss. The face is then machined again to a stop and the edge of the tool being ground with the correct angle the bevel is formed by feeding the tool down to another stop.

By this method these machining operations are simply fed, being almost automatic.

The 0.4375 in. hole is then bored in the centre of the boss and countersunk, using a combination tool in the turret of the lathe.

After the tools are once set to the correct positions all the dividing head bases may be machined with these various operations without again resetting the tools.

The next operation is drilling two 9-16 in. holes, using the jig shown in Fig. 14. The casting is located by the machined vee slots and pushed against a fixed pin

at the rear with the thumb screw A; two screws B hold the piece in position in the jig.

The two holes noted are then drilled, the tool being guided through the bushings shown in the usual manner.

The small bosses through which the holes are drilled are next faced, no jig being used, however, to hold the casting, which is held on the drilling machine table. The graduations are next machined or cut on the bevelled surface of the base and the special machine used is shown in Figs. 15 and 16.

The casting is held on a stud as shown which fits into the 0.4375 in. hole.

The machine is provided with an index wheel A on the periphery of which 360 teeth have been cut.

When cutting the graduations the operator feeds around the index wheel by means of the level pawl B to obtain the 360 spaces or graduations.

The marker is shown at C, which is operated by a crank motion. Or the crank arm at D is a cam on the periphery of which notches are cut at various distances from its centre, which represent 1 deg., 5 deg. and 10 deg. The operator then indexes the wheel around and drawing the cam by means of the lever E to the first position with the

machine in operation the marker makes, say, the first graduation representing 1 deg., which is a short line.

The next indexed position is then made and the cam being moved over another short line is made so on up to the fifth. At this position the cam profile is further away from its centre and the marker makes a longer line.

Then four short lines are marked and at the fifth a still longer line is made again owing to the profile position being further from the centre.

In other words, taking the profile stops in rotation we have four short dis-

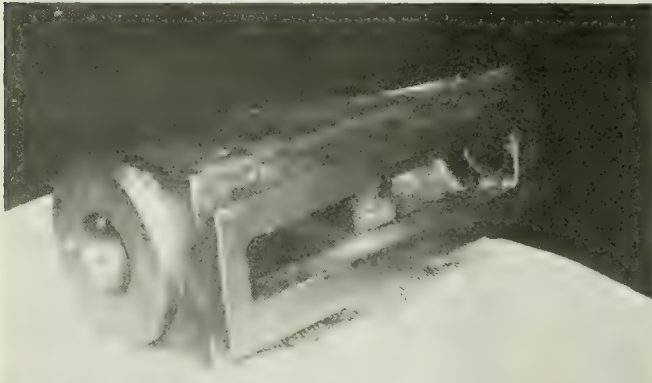


FIG. 9—A FINISH MACHINED CASTING.

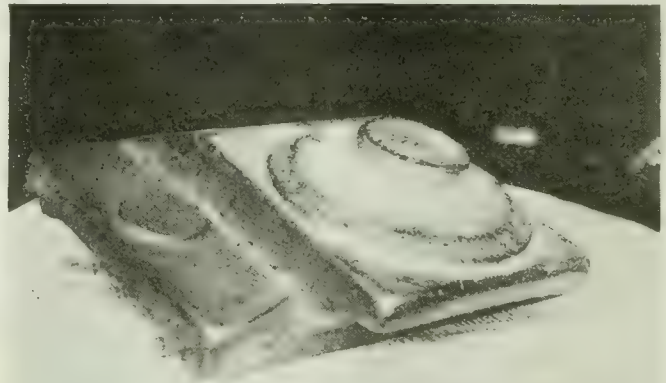


FIG. 10 A ROUGH CASTING.

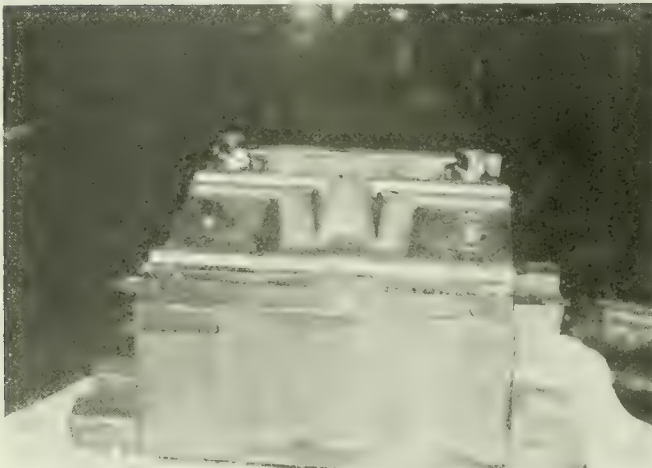


FIG. 11 MACHINING THE VEES.

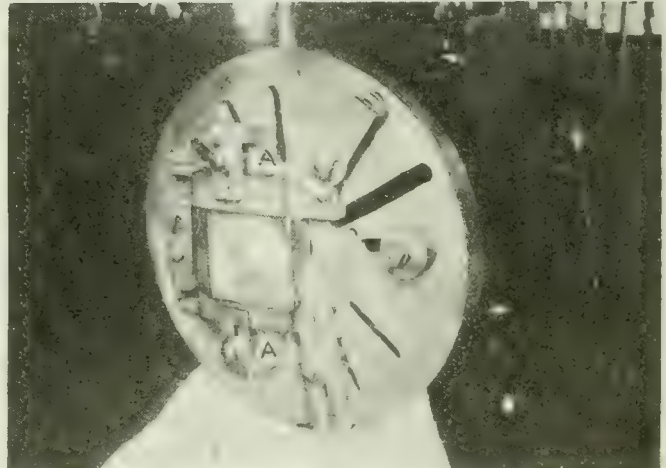


FIG. 12—MACHINING THE BOSS.



FIG. 13—FACING THE BASE.

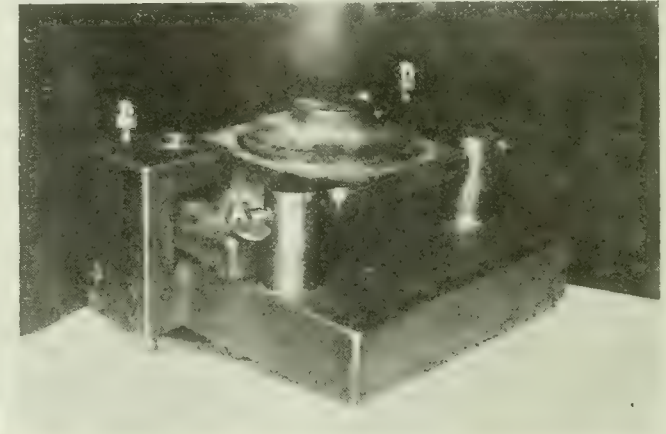


FIG. 14—DRILLING THE BASE.

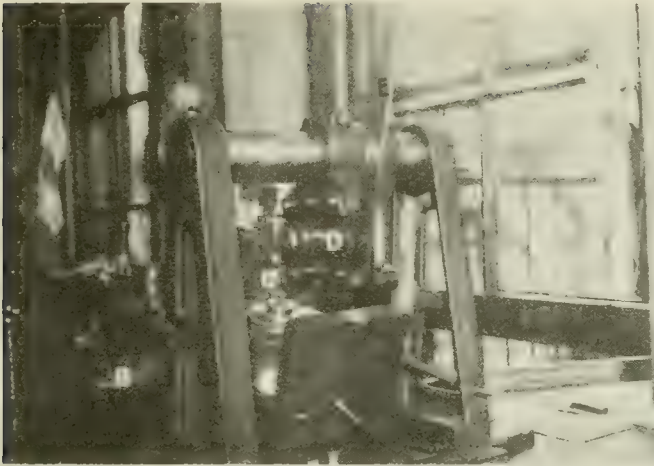


FIG. 15 GRADUATING THE BASE.

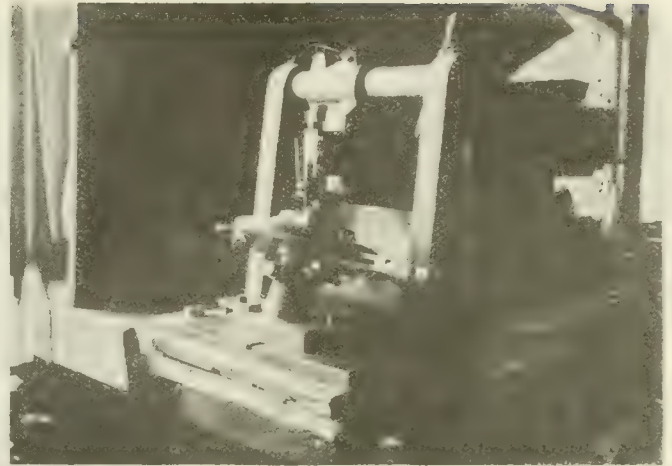


FIG. 16 ANOTHER VIEW OF GRADUATING MACHINE

tances, one long, four short and one the longest of all.

By this system we obtain the degrees by short lines, the fifth long, again four short and one the longest of them all. A similar system or method is used when making graduation to the English measurement, the only change being the substitution of a new cam and index wheel.

The graduations are next stamped with the correct reading 0 to 360 deg., after which the surface is polished to remove the burrs.

In Fig. 17 is shown one of the completely dividing head bases after it has gone through the various operations here described.

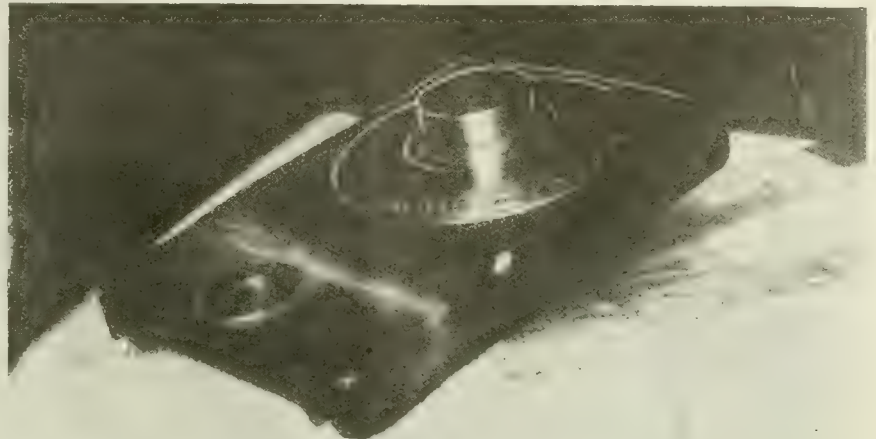


FIG. 17 A FINISHED DIVIDING HEAD BASE.

EASY METHOD OF LOCATING ARTICLES, PAGES, ETC.

By J. E. M.

Occasionally one requires to make frequent reference to some page or some tabulation in a book. In such cases I have found a Niagara clip very convenient. Obviously any other small wire paper clip may be used.

With this slipped onto the right leaf, one can pick up the book, place his thumb on the clip and immediately open the book at the exact place. The clip keeps its place well and may be left there indefinitely, as it will not cause any inconvenience at any time and is always ready for use whenever that page of the book is to be consulted.

For reference books of five hundred pages or over and which are generally consulted by use of the index and find it facilitates page finding if small stickers are placed at every hundredth page. One end or side (about one-half the total area) of the sticker, is attached to the margin of the page and the projecting part of the sticker is doubled back upon itself, thus presenting a clear unobstructed surface on either side. The first one is placed near the top of the book, the last one near the bottom, and the others evenly spaced between. With the book thus marked one can judge to within a very few pages of just where to open. Placed as above, the projections are about $\frac{1}{4}$ the size of the label.

Another method is to draw a mark across the edges of the leaves (closed) between pages 100 and 200, and a little lower down a line across those from 200 to 300. Then lower again mark across pages 300 to 400, and so on. Then close the book and it will present the appearance of a number of short straight cross-bars at different points down the face of the leaves. Now place the figure one above first bar, two above the second, etc. To find, say, page 150, open at the middle of the first bar; for 250, the middle of the second bar, etc., the figure in each case representing the left hand figure in the required page number.

HOLES IN FIRES

It is highly important, in running a boiler fire, to avoid holes in the fuel bed. It is somewhat difficult to do this when the fire is thin, but an experienced man will be watching for the holes and will stop them as often as they are found. A "hole" in a fire is a place where the grate has become uncovered, or nearly so, by the burning away of the fuel, or from any other cause. Such holes have two detrimental effects. They allow large excesses of cold air to pass through the uncovered parts of the grate, thereby chilling the furnace gases and

lessening the efficiency with which the heat is absorbed from them by the boilers, and their presence also cuts down the supply of air through other parts of the fire at the same time.

Ferrouanium is the latest of the ferro-alloys to enter the lists. Uranium is a very heavy and, chemically, very active element. It is found very sparsely as a black oxide in the mineral pitchblende—the mineral in which radium was first discovered. It is found more abundantly in the Colorado radium ore, a bright yellow oxide and silicate of vanadium, uranium and lime. After extracting the radium and vanadium, the uranium remains in the residue as a by-product, usually as a soda-uranium compound. This is treated so that uranium oxide is obtained, which can be reduced by carbon in an electric furnace in the presence of iron ore or scrap iron, to ferro-uranium (30 to 60 per cent.). The recovery of uranium is not high (50 to 70 per cent.), the rest being lost in the slag. Mr. R. M. Keeney has recently described these processes in detail for the first time in the August "Bulletin" of the American Institute of Mining Engineers.



WELDING AND CUTTING



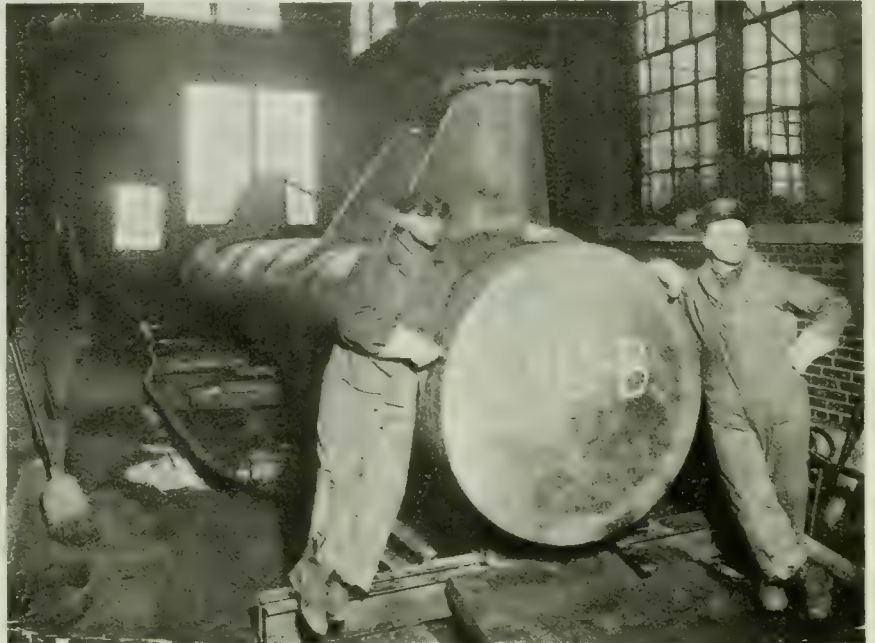
SOME OUT-OF-THE-ORDINARY WELDING JOBS

The illustrations show some examples of work which is successfully done by oxy-acetylene welding which would entail considerable expense if done by other methods.

It can readily be appreciated that to build up the header shown in Figs. 1 and 2 by riveting would result in much added expense, and would mean a much less sightly job. This header was fabricated and welded in a Chicago shop, and the method of welding on the blank head is clearly shown. All plate for the main body of the header, the four tees and the blank flange, was 7-16 in. thick. The tees, as will be noticed, are offset from the centre line of the main header necessitating careful laying off and shaping. Both the flanges and the joints of the tees, as will be noticed, were welded.

The method of welding on the blank head is clearly shown. The simple clamps shown were constructed of pieces of angle iron bolted together with one bolt, and held apart at their outer end by a metal spacer. The large angle iron clamped across the face of the head was of assistance in the preventing of warping of the metal disc.

The joint was first tack welded be-



WELDED HEADER COMPLETE

tween clamps entirely around the circumference and the clamps then removed,

after which the entire joint was finished.

Fig. 3 shows a portion of a pipe tunnel one quarter of a mile in length. All joints in the two large pipes shown, for the whole length of the tunnel were welded, no screwed connections being used. This work was done in position, and, as will be noticed, the tunnel was trenched to allow the welder to work entirely around the pipe.

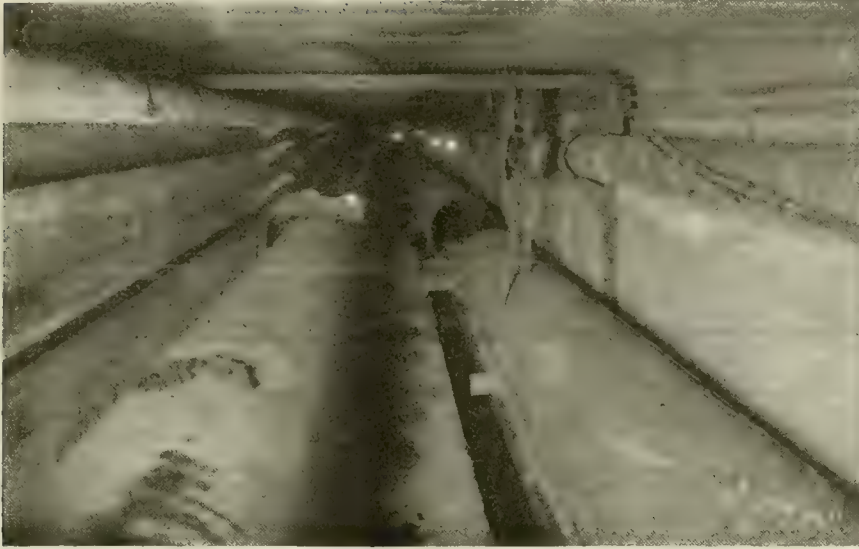
Figs. 4, 5 and 6 show another pipe job, although of an entirely different character. The cages shown were required by a large oil company for a job which called for care and neat workmanship. In all, about forty were used, although only five of them are shown in their assembled form.

The large rings shown were made up of 4 in. pipe bent to shape and welded together. In each of these rings one hundred and four circular openings were cut. These openings were cut with a Davis-Bournonville circular hand-cutting torch, and were just large enough to pass a 2½ in. pipe. The time for each hole was just 30 seconds, making it only a matter of an hour or so's time for the entire ring.

The connecting pipes between the two



SHOWING CLAMPING USED IN WELDING UP END OF HEADER.

PIPE TUNNEL, $\frac{1}{4}$ MILE LONG. ALL JOINTS WELDED.

rings were made of $2\frac{1}{2}$ in. pipe, each 15 ft. long, and were welded into the ring headers. These welds would take about 10 or 15 minutes each.

The apparatus used for all these jobs was supplied by the Davis-Bournonville Co.

ELECTRIC WELDING ARRIVES

The British Government has invited the Institution of Electrical Engineers to put forward suggestions for ensuring the safety of operators engaged in electric welding. This circumstance, combined with the approval by Lloyds of electric welding for ships' hulls under certain conditions, is a proof that this process of jointing steel will prove a formidable rival of riveting. Hitherto no general regulations have covered electric welding, and the firms engaged in it have adopted their own methods, which seem to have been fairly successful in protecting the operator himself from material hurt. The main difficulty is apparently to safeguard other workmen

who, especially in the open conditions of the shipyard work, will persist in watching the operators. The ultra-violet rays from the welding are having an injurious action on the eye, and the infra-red



FINISHED DRUMS.

rays burn the skin. Sir William Crookes has invented a glass which protects the eye against both types of radiators; and if its use is made compulsory, together with efficient screening against onlookers, it appears likely that electric weld-

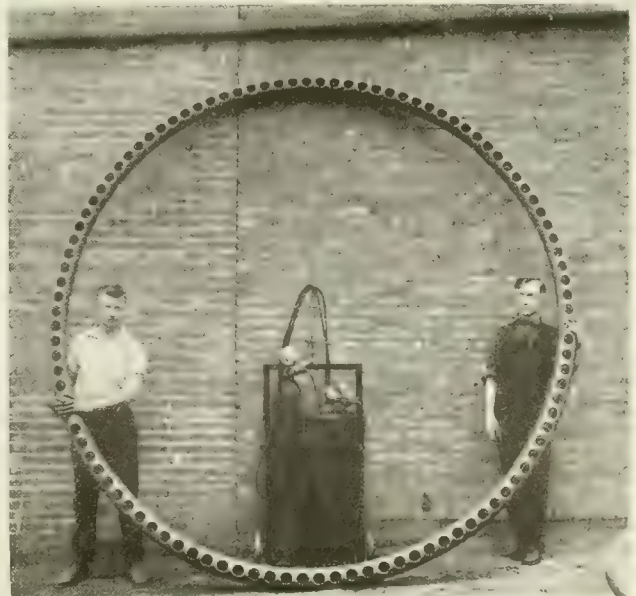
ing will become as safe as riveting. It is also admirably adapted to building up the framework of reinforced concrete vessels. Both in Great Britain and in America State research committees are busy perfecting the details of the process. A big fight is likely to be made by the vested interests (labor and otherwise) concerned in riveting, but electrical engineers are confident that welding will triumph both in the construction of hulls and in the making and repairing of tanks, ventilators and other portions of ship equipment.

ELECTRICAL ADVANCE IN GREAT BRITAIN DURING THE WAR

One of the most striking developments in industrial Britain during the war has been the enormous development in electricity supply and with a corresponding development in electrical manufactures as relating to the industrial applications of electricity, whether for lighting, heating or power. Between 50 and 100 electricity stations might be cited in which the plant capacity has been more than doubled during the past four years. The output of electrical energy has been increased to nearly the



CUTTING OUT HOLES WITH CIRCULAR HAND TORCH.



THE FINISHED RING.



WHAT OUR READERS THINK AND DO



Views and Opinions Regarding Industrial Developments, Factory Administration and Allied Topics Relating to Engineering Activity

THE MAN WHO THINKS CAN DO MUCH TO BETTER THE SHOP CONDITIONS

By WILLIAM EARNEST

IN a recent article in this paper, pointing out the numerous uses for old files, etc., there was much food for thought. By way of illustration let us in imagination leave our comfortable position and take a look inside the shop.

First of all, everything looks just the same as any other old machine shop; the greasy floors, that peculiar smell familiar to all machinists, the belts hissing, shrieking, and slipping as if in an angry passion because the good old lathes stand up so resolutely, as if arguing as to which was working hardest to turn up that shaft. The poor old shaft, having no say in the matter at all, trembles there between the centres like a sausage in a frying pan over the fire, and sends forth a savory smell. Everything looks lovely and going fine, but what a multitude of little worries each workman carries.

There is old Bill Slocum, who works on the bench, doing that fine filing and fitting, and a good mechanic he is, too. He says "it's a son of a gun to get a job done at all"; and he ought to know. He's been on the job for a long while, so we'll just ask him what's wrong. Of course, he's only too willing to have a little rest, so after spitting a wad of tobacco half-way across the room, alighting right on top of one of the boss's nice new blue prints, he begins:

"This shop's something awful since this here blamed war come; then them 'ere night men loses half the stuff around. They pinches the tool holders and tool post rockers, yer can't git a tap wrench or die stock, and if there wasn't a watchman at the shop gates, I'd be a thinking that some of them 'ere new fellers carried all the drill chucks and lathes wrenches home with them.

"Then there's them fancy toolmakers as comes from the States, sitting down to work as if they was playing pianos. They comes and borrows my screwdriver and wrenches just because they don't carry such things in their fancy crocodile skin-bound tool chests; and besides, they says as that they gits five cents more an hour than me that's worked here for

years. I tell you after the war's over I'm going farming, where everyone gits a fair show, and yer don't need so many tools."

Well, old Bill always was a grouch, anyway, but I guess there's a whole lot of truth in what he says.

Now, let us go and have a chat with those white-collared Yankee toolmakers that we heard of, and see what they have to say. There's one chap that looks a little more sociable than the others, it won't be hard to get him to talk, so we'll quizz him right away. Of course, this is only an imaginary shop, so the boss won't fire anyone for talking, so I'll start him going and that's about the last chance we'll get to say anything until he's had his say; however, the whistle will soon blow, so we don't mind at all.

"Well, how do you like the new job?"

"Like the new job!" says he. "Well, not too bad, but say! down in the States it's away different. Why! there's some system down there; system, that's the stuff! The shop where I used to work in, they had everything you could ask for. Why! we had soap, clean towels, lockers, short hours, double time for overtime, and say, there was everything you could wish for: here you can't get a darned thing to work with; the boss seems to think I ought to chase around looking for wrenches, files, and screwdrivers.

"There aint a complete machine in the whole place. I tell you, Bud, if you want to see things done right, just go to the States; they'll use you right there. Here they expect you to make bricks without straw, like the Egyptians used to do."

After a few more explosive remarks with reference to the Huns and solemnly avowing that he was all for the Allies, our friend sat down on his stool, and relaxed into an attitude of intense and profound thought, which is perfectly natural to this type of toolmaker.

We must leave him here, for it would be too bad to stop an American from

helping the Allies when he is in the mood.

Well! there is one thing we have found out; that is, that in this shop, being like most others, nothing in it is right.

It has been said that "It's a poor workman that blames his tools," and it might be added "or his place of employment, either."

Suffice it to say that there are a whole lot of things wrong in every shop, especially in the way of accessories and such things. This can hardly be controlled unless the management can see their way clear to purchase unlimited supplies, or on the other hand, the men take special interest in things generally.

Now comes the point where the old files and other small tools that are usually scrapped come in. This should especially appeal to the individual mechanic. If one gets stuck for a tap wrench, instead of racing all over the works for one, or if it is known that there is not one on the premises; what man with an ounce of backbone, couldn't fix one up out of an old file in a very little while? Or better still, if the foreman would get half a dozen old wornout files, and let the blacksmith forge them into half decent shape, and then get the apprentice boy to put holes of various sizes in each, it can readily be seen that for no appreciable cost, the missing tap wrench proposition can be solved once and for all.

Home-made stuff has a habit of lasting a long while; the polish and gloss is not there, but they are always ready for use, anyway. The same can be done in the case of missing machine wrenches.

A good heavy screwdriver can be made in three minutes by simply grinding the point of a file until it becomes red hot. Is there anything so aggravating as to have a good machinist ask for the loan of a centre punch? It is only the work of a few minutes to make a fairly good one from a round file. My belief is that there is more time saved by making an article, in the long run, than there is by borrowing and thus holding the other man up. As a matter of fact, lots of the things a mechanic requires are half-made if he only begins to look around him. If there is a moral to this story it must be "Where there's a will there's a way." The next time you are up against it, as in some of the foregoing

instances, just look around you and think for a moment, and then grab something at hand that will answer the purpose. If you form the habit of thinking, soon you will see in reality things in the shop that were never noticed previously. Instead of finding fault with conditions, your worries will cease, and everything around you will take on a useful aspect.

It might be advisable to add that if employers and foremen would allow thinking men a little license along these lines, there is not the slightest doubt that the expense for the class of goods mentioned would soon drop to almost nil. On the other hand, if the evil practice of borrowing and each man holding up his neighbor is continued, delays, dissension, and bickering will be the result, besides a real lack of small appliances on hand.

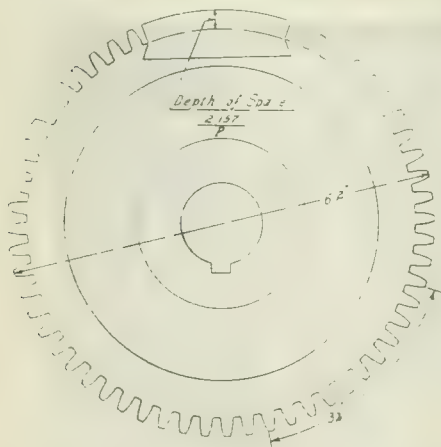
RECUTTING REPAIRED GEARS

By E. S. HALL

Machinists, when called upon to space teeth over a repaired portion of a gear, are sometimes at a loss to determine the pitch, not knowing the number of teeth contained in circle, or, through the old teeth being worn thin. A good plan is to measure round the circumference, approximate $3\frac{1}{4}$ in., and count the number of teeth contained therein; this will be the diametrical pitch. Next find the number of teeth by multiplying the whole diameter of the gear by the pitch and subtract two. Example: In $3\frac{1}{4}$ in. we have 10 teeth and the whole diameter of gear is 6.2 in., then $6.2 \times 10 = 62 - 2 = 60$, the number of teeth, and 10 the pitch. Now set the index head for 60 divisions and take a No. 2 10 pitch cutter (this to suit present example). Secure cutter on arbor and set centres to it, afterwards locking table. Next mount the gear on centres and locate depth of

2.157

space (i.e. —) by touching the patch P with the cutter in motion. Raise table



.216 after withdrawing work from underneath cutter, and adjust space to cutter. When not in motion, use the fine adjustment on index. Crank is necessary but don't move table on any account. Start machine and proceed in usual manner and the gear will be as good as new.

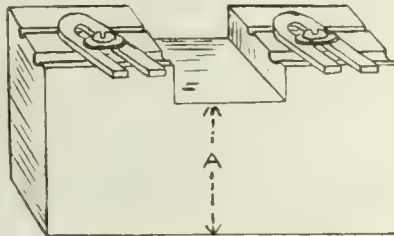
LENGTHENING TWIST DRILLS

By C. E. Hall

The accompanying sketch shows a block for holding twist drills while hard soldering extension shanks of any desired length, which has been used with great success for a number of years by the writer.

It frequently happens that an extra long drill is needed, but is not immediately obtainable.

By utilizing any scrap material, such as a piece of cast iron or cold rolled steel and shaping an opening across the centre, varying from about $\frac{3}{4}$ in. to $1\frac{1}{2}$



LENGTHENING TWIST DRILLS.

in. wide, and $\frac{1}{4}$ in. to $\frac{3}{4}$ in. deep, according to the size of drill required, and shaping out any number of longitudinal grooves varying from, say, 1-32 in. wide and upward, a means is provided whereby quite a range of work may be handled economically.

File a long bevel on the end of the drill and the same on a piece of drill rod of the same diameter, as shown in sketch, lay them in a suitable groove with the bevel focus together, and any "high spots" will at once be apparent, and a few strokes of the file will bring them into perfect alignment. Clamp in position by U straps as shown in sketch with the joint over the transverse opening and hard solder. Silver solder is best for this purpose on account of its great strength and easy flowing properties. Use borax as a flux.

The U-shaped straps are better than washers as they are easily slipped under the screw heads and quicker to remove while filing the joint.

The distance A should be generous as a good body of metal in the block prevents distortion while soldering, which might impair its future usefulness.

In case of short drills, a wad of wet asbestos or wet tissue paper placed on the cutting end will prevent the temper from being drawn.

A joint made in this manner will resist any torsional strain that the rest of the tool may be subject to. This has proved a great boon in my own case and trust it may be of some use to other readers of your valuable paper.

C. E. H.

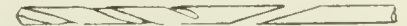
A SIMPLE PRECISION CENTRE PUNCH

By Tyke

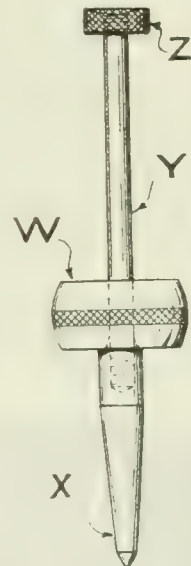
A very simple, practical and extremely accurate centre punch for precision work is shown by the accompanying sketch, and is made as follows: X is a piece of $\frac{1}{4}$ in. dia. drill rod, $1\frac{1}{2}$ in. long, drilled and tapped to suit the piece Y, which is $\frac{1}{8}$ in. dia. and $\frac{3}{4}$

in. long, threaded at both ends, the upper end of this piece being fitted with the finger button Z. The weight W is a piece of cold rolled, 1 in. dia. and about $\frac{1}{2}$ in. long, turned to the shape shown, and knurled about the centre as shown. This piece is drilled to be a sliding fit on piece Y, the underside hole being very slightly bell-mouthed in order to overcome closing in on stem Y by continued use.

After the job has been marked off in the usual way, the punch is held with the weight W as close to the top of the stem Y as possible, and when this is



practically square with the surface of the job the weight is released with as little disturbance as possible, the slight impact of the weight is sufficient to neatly mark the job in question, and providing the punch point has been ground perfectly round, the impression thus

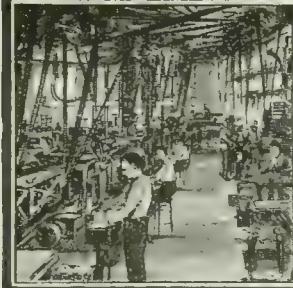


HANDY CENTRE PUNCH.

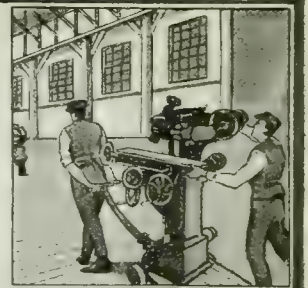
made lends itself to indicating with extreme accuracy.

The whole centre punch can be made in a few minutes, and is well worth having in one's tool chest.

Crystalline selenium, in which light produces so remarkable a lessening of electrical resistance, proves to be not the only substances so affected. In the experiments of the United States Bureau of Standards to determine precisely the properties of different materials, such compounds as jamesonite, cylindrite, silver sulphide, bismuthinite, boulangerite, stibnite, and molybdenite showed some change in electrical conductivity with varying light in the same way as the element selenium.



DEVELOPMENTS IN SHOP EQUIPMENT



Makers of equipment and devices for use in machine shop and metal working plants should submit descriptions and illustrations to Editorial Department for review in this section.

KENT KEG-KONVEYOR

An extremely simple device for the rapid handling of kegs has been placed on the market by the Kent Machine Co., Kent, Ohio. As may be seen from the illustrations herewith, it is of very simple construction, easily operated, and is said to have a greater capacity for moving more kegs in a specified time than many other forms of handling devices which can be operated by one man. In operation the device is extremely simple and a man can easily become accustomed to its use; he approaches the keg with the hoop up against the handle of the conveyor; then by a slight movement he drops the hoop over the keg and brings the handle down ready to start pulling the load. Two spurs on the lower part of the device help to pick up the heaviest load and prevent the keg from slipping while it is being transported.

Durable materials are used in the construction of the keg-konveyor, the sides and other wooden parts being made of ash with wrought iron fittings.

THE MILWAUKEE SHAPER

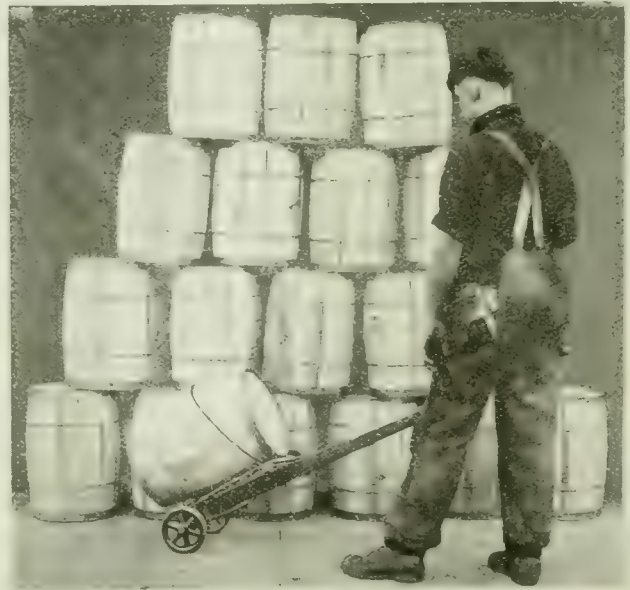
The tool described here is the latest to be turned out by the Milwaukee Shaper Co., Milwaukee, Wis. The makers claim for this machine extreme simplicity of design, embodying a minimum of working parts, with a consequent absence of jarring or vibrating. The stroke control is actuated by a rack and pinion, and a roller working in a cam on the barrel. It can be adjusted instantly. An indicator is provided on the hand wheel to show when the required length of stroke has been attained. A nut is provided on the hand wheel spindle to lock it when the stroke is set. The table can be swung to any angle by loosening three nuts, and a stop on the apron is provided to bring it back to true position. For some kinds of work the table can be removed, and the work strapped to the apron. The ram is designed with a view to strength, the bearings being made full in width, V shaped and scraped down to a perfectly accurate fit, insuring smooth working, and allowing for the wear to be taken up. The tool head is graduated, and can be swivelled to any angle, while the down feed is provided with a micrometer adjustment. The vise swivel

is provided with a graduated base and heavy steel jaws, while for tapered work an extra set of jaws are furnished. The cross rail is designed with extra long, wide bearing surfaces, which are accurately scraped to a true bearing. For taking up wear, a taper key is provided in the apron. Besides the usual swivel table, a tilting table is furnished at a slight extra charge, which can be adjusted from 0 to 7 degrees. The feed arrangement is designed without connecting rods. The gears work on a spline and are always in readiness for action when the table has been set in position. The back gearing is strong, and the change from compound to single can be made very quickly by simply moving a lever at the back of the machine. The column is strong and rigid, the projecting slides giving increased bearing surface to the ram, and the base is cast with strong reinforcing ribs. The base is spread out from the column to make a perfectly stiff, immovable foundation when properly anchored. The table support is provided with an adjustable leg, which can be set to overcome any tendency to spring.

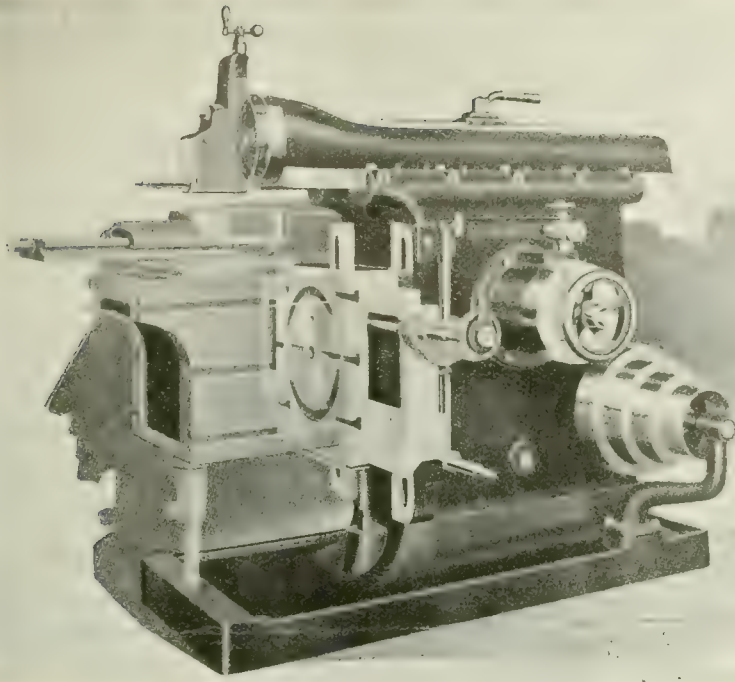
This is a compact and well designed



LIFTING KEG WITH KEG KONVEYOR



KEG KONVEYOR WITH KEG IN PLACE



MILWAUKEE SHAPER

machine, embodying some special features, which should make it a welcome addition to the available tools of this class.

THE "LLOYD ROYAL BELGE"

War-scarred Belgium has taken the first step towards her commercial rehabilitation. As plucky in peace as she was in war, she is not waiting for others to help her out, but is helping herself. And in token of her appreciation of Yankee friendship and Yankee worth, she has chosen an American to hew the way for her.

This American is Joseph A. Nash, for four years general manager of the Shipping and Purchasing Department of the Committee for Relief in Belgium. He arrived recently from London in New York in the capacity of manager for the United States and Canada of the Lloyd Royal Belge. This is a purely Belgian enterprise, the first attempt on the part of that country at direct trans-Atlantic connection between her own shores and those of North America, and the first step in the direction of weaving a strong commercial and industrial bond between the two nations. A pet project of King Albert, certain of government support, endowed with funds to insure almost unlimited expansion, the Royal Belge is in the market for ships, and assurances have already been received that every vessel that flies the red, yellow and black will cross the ocean filled with rich cargo.

The main offices of the company just now are in Paris, where the line's president, M. Arthur Brys, makes his headquarters while his old home office, at Antwerp, is being prepared for his return. The American branch is located at 11 Broadway, New York City, and

from there Mr. Nash is conducting his negotiations.

The Royal Belge was organized as a corporation after the war had broken out. At that time it owned forty ships, and its head, M. Brys, turned them over to war purposes. In his own country, and in France, he is considered one of the most remarkable figures of the day—immensely wealthy, yet always at work; indomitable in his determination to win for Belgium a commanding position as a commercial power and ready to sacrifice his own interests and his own wealth in the service of the nation. The leading men of Belgium look up to him as minor officers in an army look up to their general.

Of the original fleet of forty, only sixteen vessels are left. The other twenty-four were sunk by submarines or mines. Twelve of the remaining ships are temporarily flying the British flag, carrying supplies to France and being engaged in other similar work. The other four are still in the service of the Belgian Relief.

The Royal Belge has a large liquid capital of its own and a great additional sum has been guaranteed for its enlargement. The first trip, as soon as the service has been organized, is to be made between Antwerp and New York; and just as soon as this route has been fully established, the great Belgian port is to send vessels to Philadelphia, Norfolk, Baltimore, Charlestown and even Galveston. Later, Canadian ports may be added.

What Belgium needs first of all, Mr. Nash said, is American machinery. Cotton and textile fibres are next required, as well as immense quantities of tobacco. In return, Belgium will ship us her linens and needlework. Much of this is

being manufactured even now, more than 60,000 women and men being engaged in these industries. For, despite the havoc wrought by the Germans, enough has been saved to enable these people to keep at work and produce marketable goods. Glassware, too, is one of Belgium's specialties and its manufacture will be resumed on a large scale just as soon as a proper survey can be taken of what has remained intact of the country's industrial facilities and what is in need of reconstruction.

PREVENTING THE GROWTH OF CAST IRON

Amongst the fascinating problems which make engineering science at once a most exacting and a most fruitful study the characteristic behaviour of metals under varying conditions provides many curious cases. For example, grey cast iron grows appreciably in volume when exposed to high temperature. This characteristic, which causes much trouble in cast dies, valve seatings and other parts, is believed to be due to internal oxidation caused by the penetration of hot gases into the metal. A remedy recently suggested in England is to eliminate free graphite from the surface of the metal, this being the cause of its porosity. Successful results have been obtained by annealing the parts for several days in iron rust at a temperature of from 1,650 to 1,830 degrees Fahrenheit.

DANGERS OF STORING COAL

Coal deteriorates to a sensible extent upon exposure to the weather, and supplies that are held in storage should therefore be covered by a shed or roof that will afford a proper protection. Coal that is closely confined is likely to grow hot, below the surface, and good ventilation of the bins is therefore desirable, so that the coal may be aerated and cooled as thoroughly as possible. The heating is doubtless due to the slow oxidation of impurities, and under some circumstances it may be rapid and intense enough to set the coal afire—a phenomenon known as "spontaneous ignition." Fires sometimes originate in this way, deep down in a coal pile, and smolder, unsuspected, for a long time. They are often very hard to extinguish. To guard against the indefinite spread of fires in the coal pile, whether they are of spontaneous origin or not, the bunkers should be divided at frequent intervals into entirely separate pockets, by substantial walls of brick or other noncombustible material, especially if coal comes from mines the output of which is known to be especially prone to self-ignition.

In some parts of the United States natural cement rocks are found which contain nearly the proper proportions of materials to produce Portland cement; but even in these localities it is generally necessary to add either limestone or shale in order to get the proper mixture.

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Price Adjustment An Intricate Business

A FEW days ago two men met in the street car of one of the steel and iron cities of Canada. One man was a manufacturer who used a lot of pig iron. The other was engaged in the production of pig iron. The first man looked at iron as a raw material. He was not particularly concerned about what went into it, or whether the ore, limestone and coke were contracted for in advance at high prices, or if the labor costs were just the same as they were in war days.

The blast furnace man knew iron from the standpoint of the individual who computed the costs of raw material and labor, freight and insurance, depreciation and overhead.

The question that passed was this:—

"When is the price of pig iron going to come down?"

And the answer came back: "When is the price of soap and prunes and butter and eggs going to come down?"

An odd answer, perhaps, but not so odd if you take the trouble to think it over.

As a matter of fact, there is an economic truth stated there that is too apt to be overlooked.

The prices of pig iron, soap, prunes, butter and eggs are very closely allied, and it is well to recognize it.

It is not only impossible, but dangerous, to grab any one commodity and say, "The price is too high, and it must come down regardless of the prices of other things that have to do with its production and distribution."

The idea has been popularly entertained that as soon as the war ceased we would at once move out of the era of war prices. As a matter of fact, it would amount to nothing short of industrial suicide to attempt such a course.

Prices now show a tendency to leave war levels, but the process must be gradual. High prices are part and parcel of the war machine. They were brought about, not always because there was profiteering—although there was enough of that—but by reason of unnatural and abnormal conditions created by the exigency of war.

In the process of recession in values it is fair and just that no section of the community should be called upon to bear a larger share of the attendant loss than the same section gained in the period when prices moved toward the higher levels.

This is an intricate piece of business, and its solution may yet have to be found in some cases in Government action by the placing of business at a compromise price, and allowing the margin to be absorbed by the public

treasury. This might serve the dual purpose of avoiding calamity in price adjustment, and bringing buyers and sellers closer to the point where they can once more come together and do business on a satisfactory peace-time basis.

Another Jail Sentence

ONE Toronto man got three years and another six months for having literature in their possession that had been banned by an order-in-council. Such sentences are about the worst possible thing that could happen with the amount of unrest that is already painfully apparent in the country.

Not many months ago an Old Country publication was banned, and the fine for reading or having the thing in one's possession was stacked up in the four figures.

There was a large number of these copies in the possession of members of the House, and a number of publishing houses had had advance copies sent to them. Why, then, should there not have been action taken against all these "guilty" parties, in the House and in the publishing offices of the country?

Ottawa should make at once a very clear pronouncement upon this matter.

It is dangerous to allow men to be sent to jail, after the war is over, on the strength of orders-in-council that were passed during the stress of a world war.

IT'S hard to ship stuff to Siberia now because railroad conditions are bad. As a matter of fact, any Canadian manufacturer who wants to ship to that country also wants to know who's going to pay the bills.

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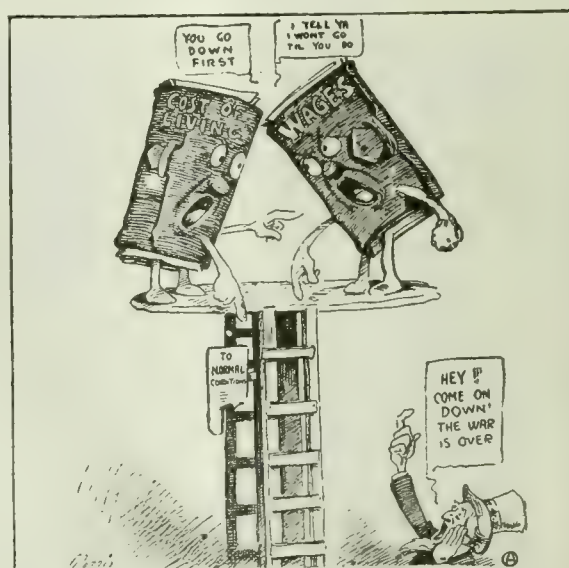
THE record for turning fuse heads in a big Toronto shop is held by a woman. There's nothing remarkable about that as women always have had a remarkable trait for turning heads.

* * *

AND now comes the word that the Kaiser is going to grow a beard. This fact will no doubt be speedily appropriated to boost the sale of all kinds of razors and chin scrapers in the Allied world.

* * *

IT HAS been brought out in the meetings of the Baptist convention in Toronto that there are plenty of ministers getting only \$900 per year. One could hardly blame these if they listened pretty hard for a call to come up higher.



WHY NOT GO DOWN SIMULTANEOUSLY?

—Morris for the George Matthew Adams Service

MECHANIC CAN'T GET TOO MUCH ARITHMETIC

Fred G. Adams, Factory Manager Russell Motor,
Says it is Essential to Success

It often falls to the lot of a man to get a presentation when he is pulling up stakes and making tracks for new territory. In fact, most folks have had occasion to fill the position that papers love to cover by stating that "the recipient replied in a few well chosen words."

But it's a bit different with Fred G. Adams, factory manager of Russell Motor. He's not leaving—in fact he's "left" after thousands of those who have been in the employ of the company during the war period have gone.

Only a few days ago J. F. MacKay, treasurer of the company, dropped into Mr. Adams' office, and intimated that he wanted to see him about something out in the shop. That "something" was a regular old-fashioned surprise party conducted on a big scale. Some 1,500 employees were assembled in one of the big departments, and it did not take long for Mr. Adams to be made acquainted with the fact that he was "IT." Following an address by T. A. Russell, vice-president of the company, Mr. Adams was led over to a handsome grandfather's clock—in fact the clock was so big and so handsome that it was much easier to lead Mr. Adams to the clock than trundle the time-piece to him. George Ellis, superintendent of the fuse work, made the presentation. The gift was simply an expression of appreciation from the employees, who desired to pay their respects to Mr. Adams in this way before the winding-up of the production of fuses took place.

And again on Friday night at the Carls-Rite, the staff of Russell Motor tendered a complimentary dinner to Mr. Adams. The menu used on this occasion smacked strongly of shell and fuse production. It was a cleverly prepared card, and well worth reproducing. It follows:—

DETONATOR SOUP A LA TOMATO

SAFETY PLUNGER CELERY PRIMER CUP ONIONS FIRING PIN OLIVES

STRIKER ROD BASS

THREADED MEUNIÈRE INSPECTED POMMES

SCRAPPED SWEETBREADS A LA III OPERATION

INTERMEDIATE ROAST GOSLIN

BELT DRESSING LARD OIL FRITTERS

SPLIT RING POTATGE

ZINC PLATED BEANS

SAFETY SPRING CHICKEN SALAD

BASE PLUG PUDDING

ASSEMBLED FRENCH PASTRY COUNTERBORED ICE CREAM

COMPOSE OF SALVAGED FRUIT

HEAD FROMAGE BODY SALTINES

EXTRACTED COFFEE

FULMINATED CIGARS

Montreal His Birthplace

Records will show that Fred G. Adams was born in Montreal, although he's apt to tell you that Peterborough is his home town. As a matter of fact, he played so much



FRED G. ADAMS

hockey, lacrosse and football there that he probably does believe that he belongs to the town. Mr. Adams will not claim that mechanics had a particularly strong appeal for him when he started his trade. His apprenticeship was served with the Canadian General Electric at Sherbrooke, and also at Peterborough, when the firm moved there. A short time was also spent at Schenectady, N.Y., with the same company, and he also worked with the Welland-Vale Co. at St. Catharines. During this time Mr. Adams was following his trade as a journeyman tool-maker. It was in 1896 that he came to the H. A. Lozier Co., which came here from Cleveland. This firm was taken in when the amalgamation of bicycle plants took place about 1900. In 1904, Mr. Adams was foreman of the tool room of Canada Cycle, then assistant superintendent, and later superintendent of bicycles and automobile machine shop. When the subsequent changes were made, Mr. Adams became general superintendent of Canada Cycle and Russell Motor, and for the past three years has held the important position of factory manager.

The Training of Apprentices.

"I like to get boys about 16 with a good education," said Mr. Adams, when discussing apprenticeship with CANADIAN MACHINERY a few days ago. "The trouble with many boys at that age is that they do not appreciate the importance of what they have learned at school. The ideal thing would be to get a boy with a high school education, but they are too old then. It's almost impossible for them to have too much arithmetic if they intend to follow the machine shop. In fact they can go only a very limited distance without a very thorough grounding in this work."

"The lack of ambition to get ahead is another thing that holds back a lot of mechanics who have the ability to go on higher up," continued Mr. Adams. "I know it means work, hard work and lots of it, but the mechanic who is going to advance has got to work for every bit of advancement that comes his way."

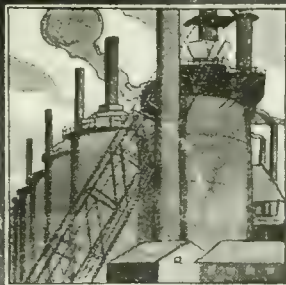
It is doubtful if any man in the business has seen more of the production of shells and fuse than Mr. Adams. It was under his direction that the first 18-pound shells were produced and shipped early in September of 1915.

"Woman workers really did remarkable service in the shops here. In fact, they made a better showing than the men." That is the confession Mr. Adams had to make after a number of years' observation. "Why here is one record worth noting," he remarked, "a woman worker working at turning the heads of fuse completed 800 in the same time as the men averaged 300. Of course, that 800 was a shop record, but there was plenty of women getting five and six hundred per shift. Another girl centred 701 shells in 7½ hours, which is remarkable work. Another girl working on the cutting-off operation on the six-inch shell turned out 141 shells in 7½ hours. We had a cash bonus system in operation. When we wanted production we offered so much cash, to be paid at once, for every record that went by the boards, and in nearly every case the cash bonus slips were handed to the women workers."

Shell Shop Training.

"I wouldn't count too much on that," was Mr. Adams' reply to a query about the value of shell shop training to a person who had not served an apprenticeship. "It may be that working around machines may have awakened instincts in a man with mechanical tendencies, but there are others, who, if they were put on a different make of lathe, couldn't go ahead and turn it over. Some of the women workers picked the idea up very quickly. We had them doing a great deal of the grinding of tools, and they were able to set up the work and get results. But on the whole I don't think the trained mechanic—of whom we have never had too many—has anything to fear from the competition of the shell shop trained individuals."

Mr. Adams keeps up a keen interest in all developments that have any bearing on his line of business, and is a close student of anything that has technical value that can be used or applied to advantage.



MARKET DEVELOPMENTS



Steel Prices Will Remain for Some Months

Trade Believes No More Reductions Will Be Made—Canadian Merchant Mills Are Meeting the Figures of U.S. Mills in This Country—Scrap Trade Still in State of Stagnation

PRICE-CUTTING on steel is not likely to continue. It seems very likely that base prices named recently will be the bottom of the market for some months to come. It is claimed that the concessions already have been made without any reduction in labor charges, and that anything else that is done in the way of price-reduction will only be possible if wages come to a lower level. It is claimed that 75 per cent. of the cost of producing steel is in the labor charges, and until this section is touched there can be no further reductions.

It is interesting to note, also, that Canadian mills, taking advantage of freight and duty, as well as war tax, are meeting prices quoted from U.S. merchant mills, and also in sheets and other lines. The Canadian mills have a much better delivery date for points in Canada than can possibly be secured from American mills.

Dealers in machine tools are not paying much attention to the war shop equipment that is being offered for sale. They refuse as well to consider taking this material in on sales of new machines. It looks as though, sooner or later, the greatest part of the war machines will have to be scrapped, and the feeling is that the

sooner this is done the better for all concerned. The quantity of used material being put on the market by the Air Force and other shops is cutting into the selling of regular lines to some extent, but the feeling is that the stuff will soon be absorbed, and the market freed of any congestion.

Mills at U.S. points are operating quite a bit under capacity now. In fact, around sixty per cent. would include most of them. They have been keyed up for several years for tremendous production. In fact, their capacity is far in advance of the orders now coming on their books. There can be only one result to this, viz., the cutting down of production, and this is exactly what is taking place.

Conditions in the scrap market are not improving. Neither are they getting any worse, for the good reason that there is no business moving by which to judge. Although some dealers report fairly barren yards, they are not minded to go out and fill up even at the present low levels. Buyers are fairly well stocked in many cases, and do not want anything.

THE ATTITUDE OF MONTREAL IS WAITING FOR DEVELOPMENTS

Special to CANADIAN MACHINERY

MONTREAL, Jan. 23—Apart from the fact that labor appears to be more plentiful, the industrial situation here shows little change. Ship-yards, locomotive and car shops are quite active, but many of the plants in this district are virtually closed except for light operations. A condition that might be mentioned here is the interest that is being taken in the rehabilitation of the returned men. At the Montreal Technical School a large number of men are receiving vocational training in connection with different trades. The classes are working in co-operation with various industrial plants, where the men spend a portion of their time in acquiring the practical knowledge necessary. The general activity in and about Montreal is well maintained, but reconstruction on a definite basis has not yet commenced.

Waiting Attitude in Steel

No marked change has taken place in the general steel situation, but the

near future may develop conditions that will create a further return to a level more in accord with the wishes of the consuming trade. Many producers are operating their plants on a basis much below capacity as such activity is sufficient to meet the existing requirements. The prevailing high cost of raw materials and the high wages paid to operate, are prime factors in the operations of the day, as producers cannot be expected to stock their yards or warehouses with material that might require to be sacrificed should the market return to a position corresponding to pre-war levels. Not only is the producer influenced by these possibilities but dealers and likewise consumers are showing the same reluctant attitude towards future business. The entire situation is one of uncertainty, and while trading for immediate purposes is still of a steady character, the buying for future requirements is almost eliminated. Dealers here anticipate a gradual return to more nor-

mal conditions, but these are largely dependent on circumstances over which producers or consumers have no control, the chief of these being the labor problem. General inquiry is good, but present prices are little inducement for domestic operations of any magnitude. The trade as a whole is looking forward to still easier prices, which, with a more steady outlook of settled business, will no doubt result in increased activity. The new price list No. 38, for wrought pipe, has been issued. The gradual return to lower prices is noted in the revised quotations, which represent a decline of from 8 to 10 per cent. over those of the previous list. The prices quoted for one inch black butt-weld are \$11.56 per 100 feet, and for galvanized, \$14.71 per 100 feet. The revised prices on lap-welded pipe are on a similar scale, the new price on 2 inch being \$28.86 and \$35.34 for black and galvanized respectively.

Metals Steady But Quiet

Little movement is reported in metals and the market is of a weak character. It is announced that production has been reduced to meet the declining demand, and smelters and refineries are operat-

ing considerably below capacity to prevent the large accumulation of stocks on the prospect of lower price levels being established within a short time. Dealers here report a steady but light demand for the various metals, but state that the prices are about the same as last quoted.

Quiet in Machine Tools

Another quiet week has passed in machine tool circles. Dealers report a poor demand, and inquiry is light. At present many plants, formerly engaged in shell making, are settling up and making adjustments regarding unfinished products and equipment. Very little can be learned as to what these plants contemplate doing in the near future. Many of those formerly engaged in regular work are still operating steadily, but plants with no pre-war standing are invariably idle. Supplies are moving slowly but prices generally are strong in character.

No Movement in Scrap

Despite the fact that price quotations on scrap and old materials were severely cut last week, no increase in business has resulted. As stated by one dealer here, "the price quoted is of little material difference as the market is so dull that business would hardly develop at any figure, and therefore one price is as good as another. With the exception of small transactions for current consumption, there is nothing doing. We are not anxious to buy and consumers are acting likewise." This explains the stagnant situation, and these conditions will likely prevail until well into the spring. Last week's prices are still maintained.

CANADIAN STEEL

MEETS U.S. PRICE

And Can Give Quicker Delivery Than Goods Coming From U. S. Producers.

TORONTO—There is a feeling in a good many lines that the confidence of the public is returning, and with this return there should come business. Reports of inquiries are frequent enough, and it is about time that some of these inquiries should be turning into real business.

Prices Have Steadied

Steel men seem to feel quite confident that the prices of steel have got past the danger mark that existed around the first of the year. There seemed to be a danger then that the price lists, with Government control relaxed, and with mills in many cases out gunning for business, would get on the toboggan, with the result that the market might be demoralized more or less. In fact, the first cut announced by the U.S. Steel Corporation was looked upon by many as only the first of many such reductions. But in the time that has passed since then, it has become apparent that this is far from the actual state. One of the representatives of the U.S. Mills, while in Toronto a few days ago, gave

POINTS IN WEEK'S MARKETING NOTES

Pittsburgh reports that mills are operating not over 60 per cent. capacity. They are strung up for tremendous production following the exertions of the past three years, and it will take very large orders to mean capacity business for them.

Steel prices are likely to remain as they are for some time. Trade seems to consider that if cutting were to start, the buying public would expect a continuous performance, and no business would result. It is also claimed that labor cost reduction is the only chance now for prices moving to lower levels.

The scrap metal market is neither better nor worse. The same conditions prevail all over the Continent. Buyers don't want to take on material although their yards are empty in some cases. Prices have been cut at nearly all points, but business remains stagnant.

Dealers in machine tools are paying little attention to the offerings that are coming on the market in the way of shell shop machinery. Much of the material is not fitted for commercial work. They do not encourage the taking in of these machines for part payment on new equipment.

Dealers who are handling wood-working machinery report that they will have a very good month's business by the time January bookings are closed.

It is his opinion that the first reduction would be the last for some time. The cut made did not affect wages, he explained. In fact he claimed that the next cut would only be possible when wages were reduced. The concession that had been made, and which made three cents a base price for plate, was on the part of the mills, and it was as far as they dared to go at present costs of production.

Large Per Cent. Labor

It is estimated that almost 75 per cent. of the cost of steel is in the labor employed in its production. Thus it will be seen that the labor cost is the large item in the production figures.

Several Canadian mills that are maintaining merchant bar mills are giving quotations to the trade that put them in the position of meeting the 2.70 base price for U.S. steel. They have not dropped their price to the 2.70 mark; in fact, it is doubtful if they could do so and make any returns at all. But add freight, duty and war tax, and you will have almost the selling

price of bars in Canada now. The same thing can be said of sheets. Another thing in favor of the Canadian mills, and one which would influence a good many orders, is the fact that they can make much better deliveries than can possibly be secured from the rollers in United States. The Canadian mills enjoy a protection of \$7 per ton, and then there is the war tax of 7½ per cent. as well as freight.

Placing Orders Here

The Fabricated Ship Corporation orders that have been placed here are creating some call for ship plate, and also other lines. This company is acting for the French Government in somewhat the same capacity as the Imperial Munitions Board acted for the British Government in this country. The shipyards generally are quite busy and dealers and warehouses report that considerable business is being placed on the books for these interests.

The Machinery Business

Dealers at several of the largest centres in Toronto report that there are a good many inquiries coming in from various sources, and some sales are resulting, although there has not been what might be called anything approaching a revival of the machine tool business. "It has taken a good many people a long time," remarked one Toronto dealer, "to recognize the fact that the machine tool dealers are not in the market for their war shop equipment. We could close a good many orders if we were willing to include in the agreements a clause to the effect that we would accept in part payment some machine tools that they were very anxious to dispose of from a shell shop. Some of these machines are strictly war shop machines. They have not even the saving qualities of being a near approach to a general purpose machine. In many cases there is no present commercial use to which they could be put. We certainly are not going to touch this material, neither is any other dealer that I have heard of. The manufacturer who is planning to bring his shop into shape to compete for the business that will be offered will make a big mistake if he stops to dicker for the disposal of his shell shop outfit first. I don't look for any serious drop in the price of high class machine tools for some time. Certainly the market is not stocked with machines of this class, and in some cases it is almost as difficult to secure satisfactory delivery as during the months of the war."

There has been a large quantity of used machinery thrown on the market during the past few weeks. The air force have put out long lists of the equipment that was used in their shops, and other factories that are turning from war work have large offerings. All this has tended to some extent to interfere with the regular sale of new machine tools, but dealers are certain that the portion of this machinery that is going to be disposed of will be absorbed

very shortly, and its influence will not be long felt.

One class of machinery that is moving out fairly well just now is in the woodworking lines, and shipments are good as well as the business being booked. Some of the firms engaged in woodworking seem to think that the big overseas demand for timber may interfere with a good quantity being left for consumption in this country. Plants having use for woodworking machinery are among the first to have confidence to re-enter the market and make their purchases at prevailing prices.

Scrap Market Dead

There is no action in the scrap market yet. The situation is no worse nor better than it was a week ago, and there are no indications pointing to anything

better coming soon. Dealers have enough material in their yards to take care of anything that may show up in the way of business for some time and they are not particularly anxious to buy even at the reduced prices they are now offering. Holders of supplies are hoping for a better figure and they are likely to hang on to their material if they can, unless there is an unknown urgency entering into the case. In fact, nearly every sale that has been made lately has some of these unusual circumstances connected with it. At some American points the market has been practically flooded with cuttings and borings from shell shops, and there are also large tonnages of shell billets offering at some points. The result of this large offering has been to send the market down to a low level.

SCRAP IRON TRADE REMAINS IN STATE OF STAGNATION IN U.S.

REPORTS from a large number of centres make it clear that there is no improvement in the scrap metal situation. In several cases it is reported that the bottom of the market has not been reached, and dealers are waiting for still lower levels to be reached before they decide upon any action. Conditions are reported to be as follows:

New York.—Prices for iron and steel scrap continue to slide, and there are hardly enough sales put through to make it apparent what the real bottom of the market is. Heavy melting steel would not bring anything over \$14. Mills have at least three months' supplies on hand and they are not buying or sending in inquiries.

Pittsburgh.—Consumers in this district have enough scrap on hand to provide for all the calls that are being made on their stocks, and they are not satisfied that the lowest levels have yet been reached. Under these circumstances they are doing nothing at all.

Buffalo.—Mills are out of the market for the present for heavy melting. A few sales of cast boring are noted, but apart from that no business is recorded.

Chicago.—Conditions here are similar to those prevailing in nearly every other centre. No sales are recorded, and despite the low prices and the fact that many of the yards here are barren of supplies, there is no business being done.

Cincinnati.—There is considerable scrap being used by the agricultural foundries, but in spite of this there is an over-supply for sale, and this has the effect of keeping the offering down in price. Some orders placed prior to 1919 are being cancelled.

St. Louis.—During the last quarter of 1918 the Government recognized a price of \$46.50 for iron car axles, but offerings now are as low as \$28. There are no signs of improvement. Buyers of all sorts of supplies are staying very much out of the market, and even the lower prices that are offering have failed to bring a buyer to the surface.

Birmingham.—There are reports here that some of the larger dealers are hopeful of the future and are now making plans to go out and buy in large amounts of country scrap at present prices, looking for a revival before long.

has been finished. That would explain the curious fact noted in last report, that production of ingots in December, taking the industry as a whole, was at a rate 2 per cent. in excess of the November rate.

Business Increasing

The common testimony is that orders and specifications are extremely light, but that they are increasing. They will have to increase quite a great deal in order to support the present rate of steel output, or indeed to keep the steel industry operating at 50 per cent. of its capacity, and doubts are entertained whether that can occur in the near future. A relatively hopeful view of the near future is entertained by some observers, who point out that so far as business is concerned the signing of the armistice came at the worst period of the year. By the time war work was largely stopped the holiday period was upon the trade, always a very quiet time in the industry, and so there has been no good opportunity thus far for business to revive. Now, however, it may do so. The season of the year, however, is still unfavorable. Trade revivals have never come in January, but rather appear in spring.

Prices

According to all accounts finished steel prices are being strictly held. This is regarded as perfectly natural in the circumstances. It is not that the mills do not need orders, for if they want to operate at anything approaching capacity they do need them badly, but because there is no incentive or temptation to cut prices. Nobody is placing temptation in the way of the mills by offering large tonnages of business at lower prices. Nobody is buying or specifying except those who must have material at once, and they are quite as ready to act at present prices as at cut prices, perhaps more so, as if there were cutting buyers would then begin to wonder how long the cutting would continue. So it seems to be settled that present prices will continue for some time to come, perhaps until spring.

Production Costs

All producers feel that there is opportunity for a very considerable reduction in cost of production with the rates of wages being reduced, and it is well settled that no general wage reduction is going to be attempted, or even thought of, for months to come. Labor performance has been very poor, but unemployment is increasing and workmen have become afraid for their jobs so that they are disposed to render more nearly a day's service for a day's pay. Those who are not willing, however, can be replaced by men who are now seeking employment. There have been printed rumors of men seeking employment and offering to work at reduced rates, but these rumors are not confirmed, and may have been put out from interested sources.

Apart from the reduction in labor cost that will come from a restoration or partial restoration of normal perfor-

U.S. MILLS RUNNING NOW AT FROM 60 TO 70 PER CENT. CAPACITY

Special to CANADIAN MACHINERY

PITTSBURGH, Pa. Jan. 23 — Steel mill operations continue to decrease. While there is noted an increase in specifications received in a number of lines, the increase is not sufficient to take up the slack caused by old orders running out. The current rate of operation is variously estimated, estimates ranging from 60 to 75 per cent. of capacity. The variation is doubtless due largely to the fact that the mills do not present an even front at all in this respect, some running much better than others, while there are also great variations in different departments in the same mill. Thus one interest states just to-day that

it is operating 50 per cent. in ingots, 60 per cent. in one finishing department, 75 per cent. in another and 80 per cent. in another. The great divergence between its rate of steel production and its average rate of steel finishing is due to the fact that it had an accumulation of ingots, due to the sudden cessation of war work, and it is now seeking to finish all raw materials on hand. No one cares to carry any stock of anything, production costs being high with prospects of costs as well as selling prices coming down. There are probably many cases like that of this mill, where more steel has been produced than

mance on the part of labor, there are various decreases in production costs occurring. Scrap, for instance, has greatly declined. Heavy melting steel under Government control was \$29, delivered, dealers being permitted to charge 3½ per cent. commission, making the actual cost about \$30. Moreover, a great deal of material was sold as "unguaranteed low phosphorus scrap" at \$34, this being an evasion of the regulations involving that higher price since the material was used as ordinary heavy melting steel. In the past week mills have bought heavy melting steel at \$20, delivered, and now fear that possibly they paid too much. This is \$10 to \$15 decline in cost of that material.

As to coke, there has been a slight softening in the market. Before the announcement last Saturday that the Fuel Administration price control of coke and bituminous coal would come off February 1 there had been sales of off grade Connellsville furnace coke at \$5.50, or 50 cents under the Government limit. While the sales were excused on the ground that the material was "off grade," the fact is that previously such coke, no matter if off grade, brought the full limit. With control to come off so soon, Connellsville coke operators will probably start cutting prices at once. They have had the idea, or professed to have it, that the Government limit was a minimum as well as a maximum price, but they have lately succeeded in getting that idea out of their heads.

The export situation has, of course, proved a very disappointing one. There has been a very considerable volume of enquiry, but mills have been unable to take much business because while, as a rule their quotations at seaboard were a trifle less than the British, the ocean freights have been adverse to the extent of, say \$20 to \$40 a ton. Possibly this situation will soon be improved, however. Last week the Shipping Board announced: "Through its division of operations, the U.S. Shipping Board today (Thursday) announced the release of all American-owned steamships from requisition charter, excepting those in the service of the War Department or employed in other Government service. In the case of these the owners are given privilege to obtain from the Shipping Board steamships of equal tonnage which they will be permitted to operate on their own account." The releases occur as ships complete their present voyages. Also, there is a cable from Paris, which may or may not be authentic, that the Shipping Board intends to write off a depreciation of \$1,000,000,000 against cost of the ships it controls, and perhaps an equal amount against the cost of the shipyards, whereby the board will be able to figure much lower freight rates. All this indicates, however, that mills in the United States should be eager to book Canadian orders at the regular "domestic" quotations

NOT MUCH DEMAND FOR PIG IRON UNTIL PRICES ARE NAMED

At present there appears to be a great deal of uncertainty regarding the prices that shall be paid for pig iron. Contracts that were made covering periods in 1919 seem to provide the centre for the greatest part of the discussion. Some sellers are making reductions so that their list of buyers will not be made to feel any embarrassment by reason of retaining the contract. Reports from some of the producing centres are as follows:

New York.—Some of the producers of pig iron are giving their customers the benefit of the new prices that have prevailed since the first of the year. In other cases special arrangements are made. It is regarded as reasonably certain that there will be a large foreign demand for pig iron. Japan needs a great deal of iron and steel, and the

chances are that the export business will develop as soon as ocean freight rates move to lower levels.

Pittsburgh.—Considerable progress is being made in the matter of price adjustments. Some producers are voluntarily cutting the price of contracts to the level placed at the last session of the Institute. As far as actual sales are concerned the market is extremely quiet.

Buffalo.—An effort is being made to hold business on the books to contracts, but in some cases it is apparent that concessions will have to be made.

St. Louis.—Leading foundrymen describe business as poor, but it cannot be said that they are pessimistic. There seems to be a tendency to wait for some person else to make the start, and until this start is made nothing much will move.

POWER SHORTAGE SAID TO HURT GOOD WELLAND PLANT

Welland Telegraph: The Union Carbide Company, Limited, one of Welland's largest industries, on Friday night laid off about two hundred men, cutting the staff from 450 to 250.

The root of the trouble is power shortage, but the gravest feature of the case is that even if abundant power were to be supplied it does not necessarily mean the resumption of work at the local plant to full capacity.

A furnace to take the place of the one at Welland has been opened at the company's plant at Niagara Falls, N.Y. A local official of the company stated to the "Telegraph" that he was pessimistic of the company's again operating the local plant to full capacity.

The Union Carbide Company, when it began operations here four years ago contracted with the Hydro-Electric Power Commission of Ontario for 40,000 h.p. All went well until the huge power demands for war manufacturing brought about the shortage. The commission cut the allowance to the Carbide to meet the situation. The company has been operating for the past two years with about fifty per cent. of the amount of its contract.

Up to the present time there has been no prospect of remedy. The great advance in manufacturing costs caused by reduced production due to the power shortage brought about the decision to transfer one process of carbide making to the plant over the river.

The most bitter irony of the situation lies in this:

A Canadian furnace, operated by 200 Canadian workmen is closed for want of electric power.

An American furnace, operated by 200 American workmen, is placed in operation to meet the case—and it is operated by Canadian power.

It is stated that everything possible

was done by the company to get from the commission some satisfaction on the power question and the decision to close down part of the plant was reached only after all hope of success had died.

John White, local manager, stated to "The Telegraph" that further reductions in the local staff might yet be made.

The curtailment of work at the Carbide is a grave matter for the city, and it does seem exceedingly futile that at a time when every agency, Governmental and otherwise, is using very effort to widen the calls for labor, that a public body like the Hydro-Electric Commission should permit the exportation of a job that requires the labor of two hundred men.

INQUIRING ABOUT CANADIAN GOODS

Trade and Commerce Department Have Inquiries From Several Sources

Information about any of the following matters can be had from the Commercial Intelligence Branch of the Department of Trade and Commerce, Ottawa, or the Secretary of the Canadian Manufacturers' Association at Toronto. The numbers should be used the same as shown in the items:

1. Iron, steel and other manufactures.—A London firm of manufacturers' representatives wish to secure the sole representation upon a commission or buying basis of Canadian manufacturers of the following goods: Malleable iron steam fittings; electrical plant and equipment for all purposes, including shipbuilding; brass fittings; pumps; forgings; stampings; machine tools, etc.; tools of all kinds; wood manufactures; chemicals;

household laundry machinery; toys; metal fittings for fancy goods, etc.

4. **Manufacturers' agent**, leaving for England end of January, would be glad to hear from Canadian manufacturers desiring representation in London, England, where he is to establish an office of the company. Over twenty years' experience in London, England, and seven years in Canada.

26. **Engineering Agencies**.—A South African engineer of many years' experience in engineering specialties and machinery is prepared to arrange for

representation of Canadian engineering firms. Immediate correspondence is requested.

27. **Cast-iron Pipes**.—A South African commission agent, with an established connection, inquires for agency proposition from Canadian manufacturers of cast-iron piping for water and sewerage purposes.

28. **Sewing Machines**.—An established commission agent covering all centres of South Africa is prepared to take up a Canadian agency on sewing machines. Hand sewing machines are the principal

sellers for the wholesale jobbing trade.

35. **Reconstruction Machinery, Implements and Raw Materials**.—A Belgian co-operative company has been organized for the re-equipment of Belgian industry and for the reprovisioning of Belgian trade. They wish to receive offers from Canadian manufacturers of machinery, implements and raw materials of every description for reconstruction purposes. This organization is recommended by the Consul-General of Belgium in Canada and it will have financial assistance from the Government of Belgium.

The Future of Shipbuilding in Nova Scotia

Large Trade Has Been Done in the Yards There During the Year
—Shipbuilders Are Not So Certain About the Future of the Industry Now That War is Over

IN a recent special edition of the Halifax "Herald," considerable attention is paid to wooden shipbuilding in Nova Scotia, showing that 67 different companies are engaged in the work. The firms and locations are as follows:

Lewis Shipbuilding Co., Sheet Harbour; Eastern Shipbuilding Co., Ship Harbour; F. K. Warren, Halifax; Beazley Brothers, Halifax; Foley Brothers, Halifax; Chester Basin Shipbuilding Co., Chester Basin; J. Ernest & Sons, Mahone; W. M. McLean & Sons, Mahone Bay; Bridgewater Shipbuilding Co., Bridgewater; W. A. Naugler, LaHave; Leary Brothers, LaHave; Bobar Brothers, LaHave; J. N. Rafuse & Sons, Conquerall Bank; Boehner Brothers, LaHave; A. V. Conrod, Parks Creek; Smith and Rhuland, Lunenburg; Southern Salvage Co., Liverpool; McKean & Rodding Co., Liverpool; Nova Scotia Shipbuilding Co., Liverpool; Shelburne Shipbuilding Co., Shelburne; Joseph McGill Shipping Transportation, Shelburne; W. C. McKay & Sons, Shelburne; George A. Cox, Shelburne; Dr. T. McDonald, Meteghan; Thomas Gorman, Meteghan; Clare Shipbuilding Co., Meteghan; S. Robichaud, Meteghan River; A. H. Comeau, Meteghan River; Acadia Shipbuilding Co., Saulnierville; Comeau Shipbuilding Co., Comeauville; Innocent Commeau, Little Brook; Fred Comeau, Little Brook; Fidele Boudreau, Church Point; Miose Belliveau, Church Point; Amos Blinn, Grosses Coques; Hankison Shipping Co., Belliveau Cove; P. A. Theriault & Co., Belliveau Cove; Benjamin Belliveau, Belliveau Cove; Hilaire Boudreau, White's Cove; B. N. Melanson, Gilbert Cove; W. K. Smith, Plump-ton; Annapolis Shipping Co., Annapolis; Captain Balcom, Margaretville; Harry Short, Port Wade; J. Willard Smith, Parkers Cove; Falmouth Shipbuilding Co., Hantsport; Martimer Parsons, Hantsport; O. O'Brien, Noel; Noel Shipbuilding Co., Noel; H. McAlloney, Canning; D. Huntley, Scotts Bay; B. L. Tucker, Bass River; Huntley & Sons, Parrsboro; S. Salter, Parrsboro; J. N.

Pugsley, Diligent River; S. J. Soley, Fox River; G. N. Cochrane, Port Greville; H. Elderkin & Co., Port Greville; L. A. Graham, Port Greville; Smith Canning, Port Greville; J. E. Pettis, Spencers Island; Allan & Fraser, Fraserville; J. W. Kirkpatrick, West Advocate; T. Bentlev, Advocate; Cumberland Marine Co., Wallace; Archibald McKenzie, River John; Charles McLellan, River John; Charles McNeil, New Glasgow.

Regarding the future of the business in the East there seems to be some difference of opinion. Statements made by several of the leaders in the industry are worth noting. In brief they are as follows:

T. H. MacDonald, Meteghan: "Wooden shipbuilding, in which I am specially interested, has been enjoying a boom in this province that is likely, in my opinion, to be short lived. War conditions responsible for its awakening after many years of slumber, cannot long survive; and with the passing of the emergency, it will become unprofitable for builders to continue in business."

H. A. Frank, Liverpool, N.S., managing director N. S. Shipbuilding and Transportation Co.: "We believe that the speculative period for vessels with the vessels such times carry, is already passed. It is true that vessels ready at this time for freight can command a very good price; but there is not the spirit of buying or the reckless disregard for cost which prevailed a few months since."

Stewart Salter, Parrsboro: "Shipbuilding in this town and the Parrsboro shore should be extra good for some time, as our own fleet of coasters is nearly extinct. Consequently, as soon as the war needs are filled with large class vessels, we will be obliged to build up our own fleet, which will take several years."

Boehner Bros., West LaHave: "We do not look for any slackening in shipbuilding in this province for the next six months. . . . With the present production of wooden vessels in Canada and United States, and the very high price

of material and labor this industry will be sure to fall off as soon as the wastage caused by the war is partially made up, unless the cost of production can be largely reduced."

J. Willard Smith, St. John: "My opinion is that the outlook for shipbuilding in Nova Scotia is anything but good. The present fictitious conditions cannot last. With 720 yards in United States producing vessels at a pace never before known, and every other country as well, the result can only be over-production, and though for a while a fair demand may exist for tonnage, a slump in freight rates must follow. Vessels being built at this time are costing far too much to face anything like normal conditions. Decline in freights will not be accompanied by similar declines in cost of operation, and as a result the owners must suffer."

Ernst Shipbuilding Co., Mahone Bay: "We anticipate a continued demand for wooden vessels for coasting trade to help reduce the congestion of freight, which we think cannot be avoided for the next couple of years. As regards fishing vessels we think the yards hereabouts will have all they can do to keep pace with the demand."

Reopen Quebec Shop.—D. B. Hanna, chairman of the Canadian Railways Commission, in a letter to Mayor Lavigne, of Quebec, reiterates the intention of the commission to operate the St. Malo workshops there

Not long ago Dr. H. Kamerlingh Onnes, of Leyden, showed that by reducing the temperature of metals to the temperature of liquid helium, or to within less than 4 deg. of the absolute zero of temperature, or more than 450 deg. below zero Fah., these lose practically all resistance, and became nearly perfect conductors. Under these conditions an electric current, once started by an electromotive force applied to a cooled mercury ring, was found to persist for hours after the electromotive force had been removed.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	\$32 75
Lake Superior, charcoal, Chicago.	37 50
Standard low phos., Philadelphia.	
Bessemer, Pittsburgh	37 25
Basic, Valley furnace	33 40

Government prices.

Montreal Toronto

Hamilton	
Victoria	50 00

IRON AND STEEL

Per lb. to Large Buyers.	Cents
Steel bars, base, Toronto	4 90
Steel bars, base, Toronto	5 00
Steel bars, 2 in. to 4 in. base	6 00
Steel bars, 4 in. and larger base	7 00
Iron bars, base, Montreal	4 55
Steel bars, base, Montreal	5 05
Reinforcing bars, base	4 50
Steel hoops	7 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	5 05
Chequered floor plate, 3-16 in.	12 20
Chequered floor plate, 1/4 in.	12 00
Staybolt iron	11 00
Bessemer rails, heavy, at mill.	
Steel bars, Pittsburgh	*2 90
Tank plates, Pittsburgh	*3 25
Structural shapes, Pittsburgh	*3 00
Steel hoops, Pittsburgh	*3 50

F.O.B., Toronto Warehouse

Steel bars	5 50
Small shapes	5 75
F.O.B. Chicago Warehouse	
Steel bars	4 10
Structural shapes	4 20
Plates	4 45

*Government prices.

FREIGHT RATES

Pittsburgh to Following Points

	Per 100 lbs.	C.L.	L.C.L.
Montreal	29	39 1/2	
St. John, N.B.	47 1/2	63	
Halifax	49	64 1/2	
Toronto	23 1/2	27 1/2	
Guelph	23 1/2	27 1/2	
London	23 1/2	27 1/2	
Windsor	23 1/2	27 1/2	
Winnipeg	81	106 1/2	

METALS

Lake copper	\$ 27 00	\$ 28 00
Electro copper	27 00	28 00
Castings, copper	26 00	26 00
Tin	75 00	78 00
Spelter	9 50	10 00
Lead	9 00	10 00
Antimony	10 00	11 50
Aluminum	43 00	50 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, 1 1/4 in.	\$ 7 00	\$ 7 00
Plates, 3-16 in.	8 50	8 40

Per 100 lbs.

Per ton

Price List No. 38

Standard Butt weld

	Per 100 feet	
1/8 in.	\$ 6 00	\$ 8 00
1/4 in.	4 68	6 81
3/8 in.	4 68	6 81
1/2 in.	6 21	7 78
3/4 in.	7 82	9 95
1 in.	11 56	14 71
1 1/4 in.	15 64	19 90
1 1/2 in.	18 70	23 76
2 in.	25 16	32 01

2 1/2 in.	40 37	51 19
3 in.	52 79	66 94
3 1/2 in.	67 16	84 18
4 in.	79 57	99 74

Standard Lap weld

2 in.	38 81	35 34
2 1/2 in.	42 12	52 36
3 in.	55 08	68 47
3 1/2 in.	69 00	86 94
4 in.	81 75	103 00
4 1/2 in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8 in.	1 93	2 44
9 in.	2 22	2 81
10 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces.

WROUGHT NIPPLES

4" and under, 45%.	
4 1/2" and larger, 40%.	
4" and under, running thread, 25%.	
Standard couplings, 4" and under, 35%.	
4 1/2" and larger, 15%.	

OLD MATERIAL

Dealers' Buying Prices.

	Per 100 Pounds	Montreal	Toronto
Copper, light	\$15 00	\$13 00	
Copper, crucible	19 50	15 00	
Copper, heavy	18 50	15 00	
Copper, wire	18 50	15 00	
No. 1 machine composition	18 00	14 00	
New brass cuttings	10 00	10 00	
Red brass turnings	13 00	10 00	
Yellow brass turnings	9 00	8 00	
Light brass	7 00	7 50	
Medium brass	9 00	9 00	
Scrap zinc	5 1/2-6	5 00	
Heavy lead	5 1/2	8 00	
Tea lead	4 1/2	3 50	
Aluminum	18 00	18 00	

Per Ton

Heavy melting steel	15 00	15 00
Shell turnings	9 00	8 00
Boiler plate	16 00	15 00
Axles (wrought iron)	30 00	15 00
Rails	20 00	15 00
No. 1 machine cast iron ..	30 00	18 00
Malleable scrap	25 00	15 00
Pipe wrought	18 00	8 00
Car wheels	25-30	18 00
Steel axles	34 00	20 00
Mach. shop turnings	9 00	6 00
Stove plate	16 00	14 00
Cast boring	11 00	8 00

BOLTS, NUTS AND SCREWS

	Per Cent
Carriage bolts, 3/4" and less.	10
Carriage bolts, 7-16 and up.	net
Coach and lag screws	25
Stove bolts	55
Plate washers	List plus 20
Elevator bolts	5
Machine bolts, 7-16 and over.	net
Machine bolts, 3/4 and less	10
Blank bolts	net
Bolt ends	net
Machine screws, fl. and rd. hd., steel	27 1/2

Machine screws, o. and fl. hd., steel	10
Machine screws, fl. and rd. hd., brass	add 20
Machine screws, o. and fl. hd. brass	add 25
Nuts, square blank	add \$1 50
Nuts, square, tapped	add 1 75
Nuts, hex., blank	add 1 75
Nuts, hex., tapped	add 2 00
Copper rivets and burrs, list plus	30
Burrs only, list plus	50
Iron rivets and burrs	25
Boiler rivets, base 3/4" and larger	\$8 50
Structural rivets, as above.	3 40
Wood screws, flat, bright	72 1/2
Wood screws, O. & R., bright.	67 1/2
Wood screws, flat, brass	37 1/2
Wood screws, O. & R., brass	32 1/2
Wood screws, flat, bronze	27 1/2
Wood screws, O. & R., bronze	25

MILLED PRODUCTS

	Per Cent
Set screws	25
Sq. & Hex. Head Cap Screws.	20
Rd. & Fil. Head Cap Screws	net
Flat But. Hd. Cap Screws.	plus net
Fin. & Semi-fin. nuts up to 1 in.	25
Fin. & Semi-fin. nuts, over 1 in., up to 1 1/2 in.	20
Fin. and Semi-fin. nuts over 1 1/2 in., up to 2 in.	plus 10
Studs	net
Taper pins	40
Coupling bolts, plus	10
Planer head bolts, without fillet, list plus	10
Planer head bolts, with fillet, list plus 10 and	10
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws	list plus 20
Collar screws	list plus 30, 10
Thumb screws	20
Thumb nuts	65
Patch bolts	add 40, 10
Cold pressed nuts to 1 1/2 in.	add \$4 50
Cold pressed nuts over 1 1/2 in.	add 7 00

BILLETS

	Per gross ton
Bessemer billets	\$47 50
Open-hearth billets	47 50
O.H. sheet bars	51 00
Forging billets	60 00
Wire rods	57 00

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	\$5 50	\$5 30
Cut nails	5 85	5 65
Miscellaneous wire nails .....		.60%
Spikes, 3/4 in. and larger		\$7 50
Spikes, 1/4 and 5-16 in.		8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, 1/4-lb. and up.	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net
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MISCELLANEOUS

Solder, strictly	0 43
Solder, guaranteed	0 45
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 16
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll ...	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 10
Linseed oil, raw, single bbls. ..	1 70
Linseed oil, boiled, single bbls. ..	1 73
Plaster of Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	list plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular....	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

	Per Cent.
S.S. drills, wire sizes up to 52 ...	35
S.S. drills, wire sizes, No. 53 to 80	40
Standard drills to 1½ in.	40
Standard drills, over 1½ in.	40
3-fluted drills, plus	10
Jobbers' and letter sizes	40
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	40
Sleeves	40
Taper pin reamers	net
Drills and countersinks... list plus	40
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus	75
High speed cutters, list plus	40

COLD ROLLED SHAFTING

At mill	list plus 40%
At warehouse	list plus 60%
Discounts off new list. Warehouse price at Montreal and Toronto	

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15½c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28..	\$ 8 00	\$ 7 00
Sheets, black, No. 10..	8 00	8 50
Canada plates, dull, 52 sheets	9 00	8 65
Can. plates, all bright..	9 50	9 50
Apollo brand, 10% oz. galvanized		
Queen's Head, 28 B.W.G.		
Fleur-de-Lis, 28 B.W.G.		
Gorbal's Best, No. 28..		
Colborne Crown, No. 28		
Premier, No. 28 U.S....	9 00	
Premier, 10% oz.	9 30	
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

B

¼ in., \$14.35; 5-16 in., \$13.85; ¾ in., \$13.50; 7-16 in., \$12.90; ½ in., \$13.20;

\$13.00; ¾ in., \$12.90; 1 inch, \$12.65; Extra for B.B. Chain, \$1.20; Extra for B.B.B. Chain, \$1.80.

ELECTRIC WELD COIL CHAIN B.B.

½ in., \$13.00; 3-16 in., \$12.50; ¼ in., \$11.75; 5-16 in., \$11.40; ¾ in., \$11.00; 7-16 in., \$10.60; ½ in., \$10.40; ¾ in., \$10.00; ¾ in., \$9.90.

Prices per 100 lbs.

FILES AND RASPS.

	Per cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	32½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50

BOILER TUBES.

Size	Seamless	Lapwelded
1 in.	\$32 00	\$.....
1¼ in.	36 00	
1½ in.	39 00	32 00
1¾ in.	39 00	32 00
2 in.	45 00	32 00
2¼ in.	48 00	34 00
2½ in.	50 00	40 50
3 in.	58 00	45 00
3¼ in.		52 00
3½ in.	70 00	54 00
4 in.	80 00	67 00

Prices per 100 ft., Montreal and Toronto les 10.

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal, bulk	18½
Palacine	21½
Machine oil, per gal.	26½
Black oil, per gal.	15
Cylinder oil, Capital	49½
Cylinder oil, Acme	39½
Standard cutting compound, per lb. 0	06
Lard oil, per gal.	\$2 60
Union thread cutting oil antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil	13½

BELTING—NO. 1 OAK TANNED.

Extra heavy, single and double..	30%
Standard	30,10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES.

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES.

Polishing wheels, felt	3 25
Polishing wheels, bull-neck..	2 00
Emery in kegs, American....	07
Pumice, ground	3½ to 05
Emery glue	28 to 30
Tripoli composition	06 to 09
Crocus composition	08 to 10
Emery composition	08 to 09
Rouge, silver	35 to 50
Rouge, powder	30 to 45

Prices Per Lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive .....	.08½
Grits, 80 and finer .....	.06

BRASS.

Brass rods, base ½ in. to 1 in. rod..	0 38
Brass sheets, 24 gauge and heavier, base	0 43

Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE.

White.		WASTE.		Cts. per lb.
XXX Extra..	20	Atlas		18½
Peerless	21	X Empire ...		17½
Grand	19¾	Ideal		17¼
Superior ...	19¾	X press		16
X L C R ...	18½			

Colored.

Lion	15	Popular	12
Standard ... 13½		Keen	10½
No. 1	13½		

Wool Packing.

Arrow	25	Anvil	15
Axle	20	Anchor	11

Washed Wipers.

Select White. 11	Dark colored. 09
Mixed colored 10	

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard ... 10%	Best grades .. 15%
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ANODES.

Nickel58 to .65
Copper38 to .45
Tin70 to .70
Zinc18 to .18

Prices Per Lb.

COPPER PRODUCTS.

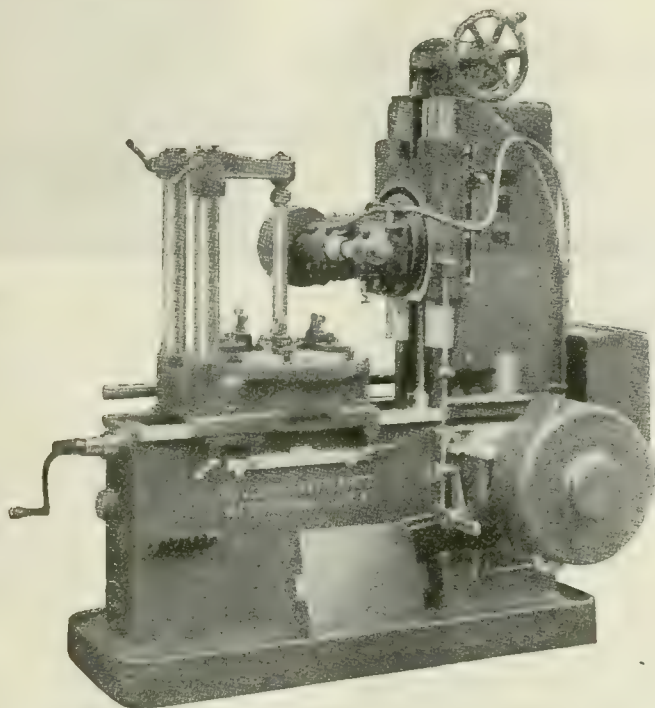
	Montreal	Toronto
Bars, ½ to 2 in.	42 50	43 00
Copper wire, list plus 10 ..		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers, in sheets, 6x4 base	45 00	44 00

LEAD SHEETS.

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	\$13 25	\$13 25
Sheets, 3½ lbs. sq. ft. ..	13 25	13 25
Sheets, 4 to 6 lbs. sq. ft.	12 50	12 50
Cut sheets, ½c per lb. extra.		
Cut sheets to size, 1c per lb. extra.		

PLATING CHEMICALS.

FLUATING CHEMICALS.	
Acid, boracic	\$.25
Acid, hydrochloric .....	.06
Acid, nitric .....	.14
Acid, sulphuric .....	.06
Ammonia, aqua .....	.23
Ammonium carbonate .....	..
Ammonium, chloride .....	.55
Ammonium hydrosulphuret ....	.30
Ammonium sulphate .....	.15
Arsenic, white .....	.27
Copper, carbonate, annhy .....	.50
Copper, sulphate .....	.22
Cobalt, sulphate .....	.20
Iron perchloride .....	.40
Lead acetate .....	.35
Nickel ammonium sulphate .....	.25
Nickel carbonate .....	.32
Nickel sulphate .....	.35
Potassium carbonate	1.80
Potassium sulphide (substitute)	2 25
Silver chloride (per oz.)	1.45
Silver nitrate (per oz.)	1.20
Sodium bisulphite .....	.15
Sodium carbonate crystals .....	.05
Sodium cyanide, 127-130% .....	.40
Sodium hydrate .....	.22
Sodium hyposulphite, per 100 lbs.	6.00
Sodium phosphate .....	.18
Tin chloride	1.75
Zinc chloride, C.P. ....	.80
Zinc sulphate .....	.15
Prices per lb. unless otherwise stated.	



Gould & Eberhardt Gear Hobbers

For cutting Spur, Helical and Worm
Gears up to 120" dia. Also

Multiple Spindle, Continuous Operation Automatic Roughing Machines for large production.

Put your gear-cutting problems up to us. Catalog on request.

Write for prices and deliveries.

A. R. Williams Machinery Company, Limited

ST. JOHN, MONTREAL
WINNIPEG, VANCOUVER

If It's Machinery, Write Williams''

64 W. FRONT STREET
TORONTO

Acid Electric STEEL CASTINGS

Acid Electric Steel Castings show superior ability to resist wear and crystallization. They are smooth in texture, free from Blow Holes, and machine perfectly. We specialize in

Railroad and Other High Grade Castings

up to 15 tons, any specification. Electric Steel Castings COST NO MORE than ordinary Steel Castings.

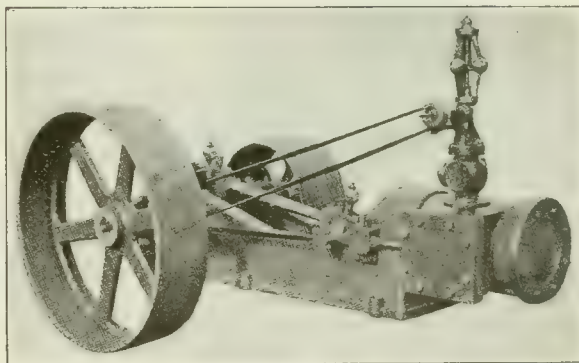
Prices on Application—Prompt Deliveries

The Thos. Davidson Mfg. Co., Limited

Steel Foundry Division, Lachine Canal

Head Office: 187 Delisle St. MONTREAL
Phone Victoria 1492

For Sale at a Bargain



SECOND-HAND ENGINE In Good Working Order

Cylinder 8" x 12". Centre Crank made from a steel forging. Pulley Flywheel 34" x 8 1/4".

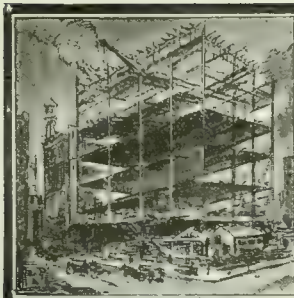
DEVELOPS 25 HORSE-POWER

This engine was used by us in our own shops with perfect satisfaction until we electrified our whole plant, since which time we have no further use for it.

Marsh Engineering Works, Limited

Established 1846

Belleville, Ontario



INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS
PERSONAL AND TRADE NOTES



ENGINEERING

Toronto.—Dominion Shipbuilding Co. has taken out a permit to build a lumber storage shed and a boiler house at the plant at the foot of Bathurst street.

Welland.—The Maple Leaf Milling Co. last week let the contract to J. T. Tromanhauser, of Toronto, for the rebuilding of the mill at Welland, recently destroyed by fire.

The contract does not include the installation of machinery, for it is not the intention of the company to resume milling operations, at least for some time. The building will be replaced as it was before in regard to walls, roof, flooring, and heating. In fact, it will be made ready for the machinery when decision is reached as to putting it in.

Welland.—The Dominion Government contemplates the enlargement of the Government elevator at Port Colborne to double its present capacity by the erection of a new section with a capacity of one million bushels. J. H. Tromanhauser, who built the Maple Leaf mill at Port Colborne, has been asked by the Department of Railways and Canals to prepare an estimate on the cost of the addition, and this work is now under way. The Department has doubtless been actuated in its decision to enlarge by the tremendous congestion of grain in the past year.

MARINE

New York.—The Cunard Steamship Company has purchased from the British Government six cargo steamships of an aggregate tonnage of 29,734, it was announced here to-night. The vessels, standard cargo carriers built by the British Government for use during the war, will soon be placed in active service by the company. The purchase price was not made public. The vessels, which were of the "war series," have been re-named.

Montreal.—Ocean freight rates have been reduced on commercial traffic, and the British Government is releasing a certain amount of space for commercial cargoes. Rates all around show a considerable reduction, and the indications are that by the time the season opens again in the port of Montreal freight rates will have been materially reduced. Three months ago the rate on general cargo was \$6.50 per 100 pounds, and now it is \$3.50.

Port Huron, Mich.—Supt. A. R. Morrison, of the Foundation Company, says

that the company is making ready for the construction of what will be one of the largest drydocks on the Great Lakes. It will be 659 feet long and will have sufficient depth and breadth to accommodate the largest boats on the lakes. A wharf 1,100 feet long is now under construction for boats which will moor at the plant. Mr. Morrison says that contracts for the ten steel tugs for the French Government have been cancelled. His statement dispels rumors that the Port Huron plant is to be only a temporary affair. The construction of the dry-dock will be rushed in the spring. Meantime repair work will be done on five steamers. The two sections of the steamer Paipoo are now in drydocks being welded together. Matters are now being adjusted with the steel mills to provide a supply of steel.

Hamilton.—The decision was reached

at a special meeting of the Board of Control that a deputation should wait on the Dominion Government at an early date and have it include in its estimates for the year, public works for Hamilton, calling for an expenditure of about two and a half million dollars. Those who were appointed members of the deputation are: Controller Jutten, Controller Halcrow, T. J. Stewart, M.P., Industrial Commissioner C. W. Kirkpatrick, A. C. Garden, President of the Board of Trade, and Capt. George J. Guy, chairman of the Harbor Commission. The Government will be urged to commence work on the harbor development scheme, which will require about \$1,500,000 to carry out. The scheme embraces the purchase of the Stipe's farm and converting it into a large basin and channel where steamers will be enabled to turn around without backing out into the bay from their slips.

BIG MERGER IN HAMILTON WHEN HARVESTER TOOK OVER OLIVER PLOW

HAMILTON.—A. C. Dann, manager of the Oliver Chilled Plow Company, on Wednesday last made the following announcement:—

"The International Harvester Company of Canada, Limited, has purchased the Oliver interests in the Oliver Chilled Plow Works of Canada, Limited, located at Hamilton, Ont. The name of the company will be changed. The Harvester Company assumes immediate control and operations of the property."

Mr. Dann refused to discuss the matter, except for the official statement. Mr. Dann came to Hamilton in May, 1910, and saw the big plant erected, and has been here ever since, making many friends who are expressing the hope that he will remain in the city.

The Oliver Plant employs about 1,000 hands, and covers some 85 acres of land. The two plants, which adjoin each other, will occupy about 200 acres. Both plants now employ about 3,300 men. As the International Harvester Company have always acted as the selling agents of the Oliver Company, it is believed the merger will really result in very few changes.

H. H. Biggert, superintendent of the International Company of Canada, made a statement that the International Harvester Company now owned the entire capital stock of the Oliver Chilled Plow Works, Limited, at Hamilton, and had

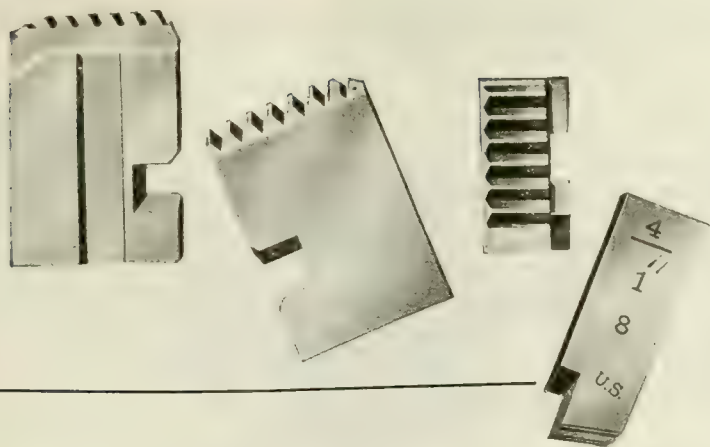
assumed control and operation of the property. The operation will continue under the new ownership with the present personnel. However, the name of the Oliver firm will shortly be changed.

The manufacture of the types of plows made at Hamilton will be continued, but will be marketed by the Harvester people as their own product.

This was one of the largest realty deals that has been made in this city in a number of years, and is a follow up to the statement made by H. H. Biggert of the Harvester people a short time ago that his firm would enlarge its plant, in anticipation of an increased demand for agricultural implements, both for home consumption and export. It is said in civic circles that it may result in a saving of taxes, as the Harvester Company's fixed tax rate has several years to run yet, although full taxes on other industrial concerns will be collected this year. The Oliver Chilled Plow Company, Limited, pays taxes now on 50 per cent. basis on \$98,000, half valuation of \$196,000. Its land is valued at \$76,000 and the buildings at \$120,000.

The former holdings of the International Harvester, according to the assessment books, were \$1,255,000. The buildings are valued at \$1,000,000 and the land at \$255,000.

The Oliver plant is said to be one of the most modern in the county—plows



Sharp Chasers Cut Clean Threads

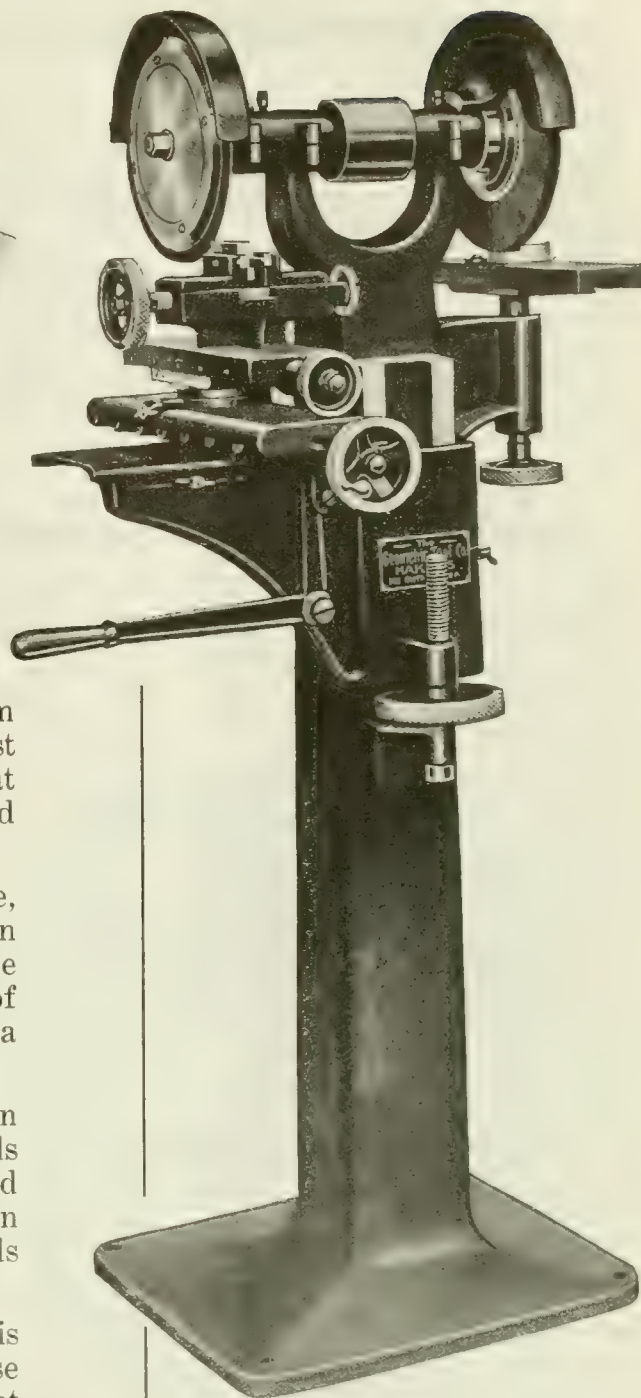
Accurate, uniform threads result only from dies which are maintained in the highest state of cutting efficiency. This means that chasers must be kept sharp, and ground uniformly.

Even if just touched up from time to time, the chasers respond splendidly, with clean threads. And with this machine — the Geometric Chaser Grinder — the matter of keeping threading tools up to scratch is a comparatively simple matter.

Various makes of chasers can be ground on this adaptable machine. The two wheels permit the easy grinding of both milled and tapped chasers. In addition, the plain wheel lends itself readily to various kinds of tool grinding.

Uniform grinding of a set of chasers is purely a mechanical matter through the use of adjustments which can be accurately set to govern the grinding of an entire set of chasers.

The Catalog describing this machine is a mine of information on chaser grinding. Write for it.



THE GEOMETRIC TOOL COMPANY
NEW HAVEN CONNECTICUT

Canadian Agents:

Williams & Wilson, Ltd., Montreal. The A. R. Williams Machinery Co., Ltd., Toronto, Winnipeg, St. John, N.B.

only are made. In the Harvester plant almost every large implement—except plows are made—and this includes tractor engines and motor trucks.

The absorption of the Oliver Company by the International Company again draws attention to the fact that Hamilton has the largest farm implement plant in the British Empire, and it is still growing. The two companies have had friendly working relations in the past, not being competitors; the International Company marketed the products of the Oliver Company and made a sales force for the Oliver people unnecessary. The plants of the two companies are side by side on the water front; and it is said among official circles that there will be a saving among executive offices.

TRADE GOSSIP

Cars Scarce in Britain.—Extraordinary prices are being obtained for second-hand cars in England. A Rolls-Royce in good conditions has just changed hands for \$15,000. The present condition of the motor industry is so behind that it is quite likely that a year will elapse before new buyers can be assured of supplies.

Hard on Siberian Trade.—C. F. Just of the Canadian Economic Commission to Siberia is at Vladivostok awaiting the arrival of his fellow commissioners. The Canadian Press is informed by competent authorities that the vast trade possibilities for Canada in Siberia are unavailable owing to the lack of transportation in the interior of the country. It is stated here that the railway situation is the dominating factor in the entire Siberian situation.

Flight Across Ocean.—Gen. Brancker, who is giving up his post as Master-General of Personnel in the British Air Ministry to devote his time to commercial aviation, in an interview with "The Daily Express," asserted that a flight across the Atlantic probably would be accomplished in May. He added that the trip was feasible at the present moment, as there were three or four types of airplanes available which were capable of making the flight.

Priorities on Gas.—The Mayors of Chatham, Windsor and Sarnia, managers of gas distributing companies in those places, met in the office of Gas Commissioner Estlin, at Chatham, and evolved a scheme to put into force with the usual shortage of gas which follows a cold spell. In the event of a shortage consumers will be cut off in the following order: Libraries, clubs and theatres, schools, churches, and public buildings. Places with a reserve supply of fuel will be requested to use the same during a shortage.

Conditions in Windsor.—The big Maxwell plant here is shut down for the present. The Kelsey Wheel Works is about ready to begin operations. The Swedish Crucible Steel Company are now employing about 45 men, but it is anticipated that the excellence of their product will make extension inevitable.

Another advantage of the steel casting will be that they can replace the drop forging when the manufacturer wishes fifty or one hundred articles of a kind. The cost of expensive dies is saved.

Annual Gathering.—Agents and travelers of the Renfrew Machinery Co. were in Renfrew from various sections of the Dominion for the annual conference and banquet. There are about 150 of them, a record number—indicating a material increase in business during the past year. The company looked for a larger attendance than usual, but thought that perhaps the wave of influenza which has been felt throughout Canada and is still epidemic in many places would tend to keep not a few of the agents and travelers at home.

Now is the Time.—"Tell every Canadian who has anything to ship into the Maritime Provinces, whether it is pianos or soda biscuits, to ship at once," said an official of the Canadian Railway War Board. "To-day it is easy to get shipments into the Maritimes because Great Britain has embargoed shipments amounting to about 80 per cent. of the traffic from Canada, and we have therefore stopped the movement of overseas export stuff east to Halifax and St. John. Ordinarily that movement is so heavy that shipments for domestic consumption in those parts of Canada have a hard time getting through. Now is their opportunity."

Shell Shop Training.—Speaking of the training that had been received in shell shops, J. S. Woodhouse, general superintendent of W. H. Banfield & Sons, Ltd., stated to CANADIAN MACHINERY:—"I believe that while a number of the best tool-setters, also some of the better machine operators, whom we have educated along these lines, would be far more readily trained as a machinist than absolutely green help; and there is little doubt in my mind but that the best of these tool-setters will be used on production work, setting up, etc., where we previously used machinists, but I believe that a skilled mechanic is in no great danger of being replaced by these specialists."

Trade Conditions.—G. T. Milne, His Majesty's trade commissioner in Canada, in an interview at Montreal, said, among other things: "It is an axiom of business that a country to export, must import," he continued. "That is rather a contradictory phrase on its face, but we must understand that if we are to sell our goods to another country we must also purchase some of their goods. If not, how are they to pay us for our goods. In gold? Never. In order to build up an export trade, one of the first essentials is to have a wide home market," he said. "This alone lays a strong foundation to an export trade. . . . This was peculiarly true of the British Isles. Canada no longer is a land of raw materials and natural resources. Many things that were previously imported will now be manufactured, and the close of the war leaves us with immense factories ready to be turned over into peace-

time channels for the production of finished articles."

May Enlarge Plant.—Announcement comes from Hamilton that the management of Dominion Foundries and Steel are contemplating enlarging the scope of their plate department by the installation of the plate mill at the plant rolls 24-inch universal or 84-inch sheared. At present the plate mill at the plant rolls 24-inch universal, and it has been the plan of the company for some time to go ahead and roll the larger sizes. There is nothing to indicate that the work will be proceeded with immediately. Plate is imported largely from the U.S. mills and there is considerable business offering for a mill that can come into operation quickly and make definite deliveries.

PERSONAL

Col. Robert Lowe, of the firm of Bate and McMahon, died in Ottawa. The late Col. Low came into prominence in connection with several big engineering works which he had carried out while with Bate, McMahon and Company, the Ottawa contracting company. Among these was the building of Camp Borden, where he attained national fame as a builder, and later the reconstruction of Halifax.

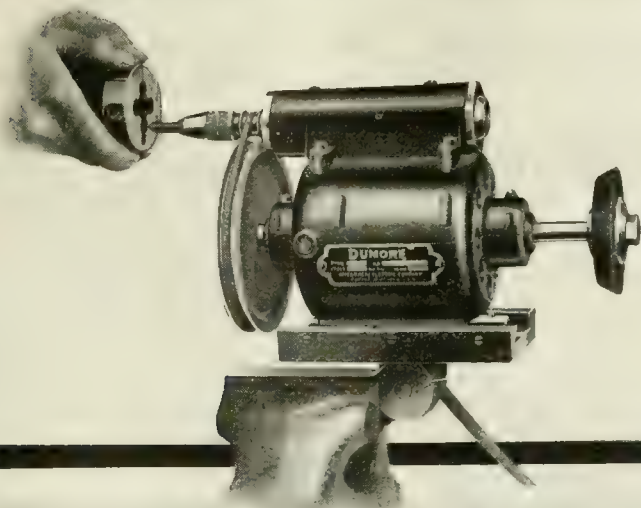
Captain George L. Mackey, one of the best-known vessel and steamboat captains on the Great Lakes, died at his home at St. Catharines from apoplexy. He was born on Wolf Island 66 years ago, and had lived in St. Catharines for 40 years. He was in the employ of the late Sylvester Neelon for a number of years, and later with Miles Transportation Company and R. O. & A. B. MacKay, Hamilton, and latterly with the Canada Steamship Lines, retiring two years ago.

CATALOGUES

The Harvey Hubbell Co., Toronto, have issued a new catalogue on their electrical specialties. This catalogue features the many electrical specialties manufactured by the firm, and the many possible combinations of interchangeable sockets, pull switches, attachment plugs and plug receptacles are illustrated in chart form, and in such a manner that it is an easy matter to make up any particular combination which might be desired.

Across the top of the chart pages appear illustrations of various socket caps, wall and ceiling bases, and down the first column on the first page of each set is a series of socket and pull switch bodies. The rest of the page bears complete views of numerous combinations made up of these interchangeable parts. In addition to the above, the catalogue illustrates the other specialties manufactured by the firm, such as special sockets, both brass and porcelain and particularly Hubbell reflectors for industrial illumination. These reflectors are shown in such a manner that it is a very simple manner to pick out the proper reflector for any particular work.

Regrinds Button - Dies in 3 Minutes

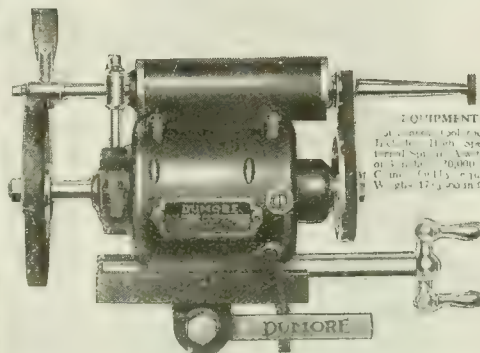


A GOOD example of one form of saving made possible through the use of the **DUMORE** grinder is found in the above illustration. Here is the attachment known as Equipment C that regrinds button-dies at the rate of twenty an hour. The special spring chuck holds an emery pencil that travels at the rate of 50,000 R. P. M. which has been found to be the correct cutting speed for work of this nature. Reclaiming these old and seemingly worthless dies, which formerly had to be discarded, means an enormous saving in the course of a few months.

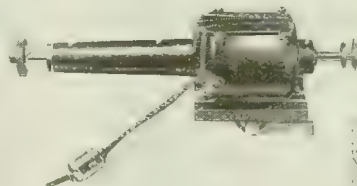
The **DUMORE** grinder is portable and so constructed that the attachments are interchangeable. In other words, Equipment C may be detached and Equipments A or B put on. This gives the tool a very wide range of operation and makes it indispensable to the shop interested in securing the very best results. The **DUMORE** grinder is in perfect running balance and gives even small emery wheels the correct cutting speed. Chatter, taper or bell-mouthed grinding is thereby eliminated.

If your dealer does not carry the **DUMORE** in stock, write us for specifications and prices.

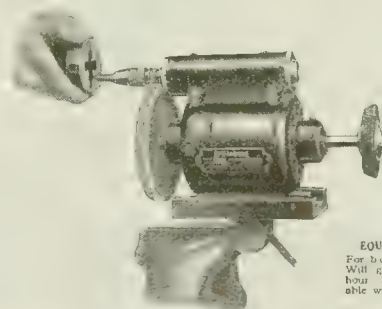
WISCONSIN ELECTRIC COMPANY
2907 16th Street — Racine, Wis.



EQUIPMENT A
At constant speed 1000 R.P.M.
Includes 11 inch speed. In-
terchangeable with Equip-
ment B. 10000 R.P.M.
Chuck fully equipped
with 12 inch emery wheel.



EQUIPMENT B
At constant speed 1000 R.P.M.
Includes 11 inch speed. In-
terchangeable with Equip-
ment A. 10000 R.P.M.
Chuck fully equipped
with 12 inch emery wheel.



EQUIPMENT C
For button dies
Will grind 20 an
hour. Interchange-
able with A and B.

DUMORE HIGH SPEED GRINDERS

MUST WORK IN GROUPS TO SECURE FOREIGN TRADE NOW

In order to impress upon manufacturers the necessity for organizing into trade groups, to be ready to compete with American industries for a share of the work of rebuilding Europe, the Intelligence Department of the Canadian Manufacturers' Association is issuing a circular calling for concerted action. Manufacturers, it is pointed out, must be prepared to turn out standardized products in quantity, and the best way to do this is for each trade to organize into groups. Illustrating the opportunities, the circular points to a condensed list of the immediate requirements of a part of Belgium only. The list includes: Copper, sheets, bars and ingots, 39,000 tons; brass, sheets and tubes, 3,500 tons; machine tools, 60,000 tons; vegetable oils, 3,630 tons; mineral oils, 4,269 tons; hawsers, steel cables, belting, electric power plants, for colliery requirements; pig iron, 1,012,050 tons; iron and steel, worked and semi-worked, 825,000 tons; transport material for railroads, locomotives, trucks, etc., automobile transportation material, trucks, trailers, cars; depot materials, turntables, forges, pits, drilling machines, jacks, etc.; working material for reconstruction of destroyed buildings and public works; builders' and constructional work, crushers, mixers, hoists, cranes; bridges, locks, etc., pontoons, chain and accessories; dredging material, dredges, tugs, sand carriers, lighters; canal equipment, lighters, pumps, compressors, tugs; machines for road and construction work, scrapers, graders, rollers, etc., boilers, engines, pumps, steam shovels; small tools, shovels, picks, mattocks, etc.; railway construction materials, rails and accessories, tool, machine tools, motors, signalling apparatus.

Agricultural machinery. — Plows, single, 40,000 tons; plows, two or more shares, 20,000 tons; skimmers, scarifiers and cultivators, 20,000 tons; harrows, 75,000 tons; ordinary rollers, 20,000 tons; disc rollers, 10,000 tons; horse hoes, 10,000 tons; potato plows, 10,000 tons; seed drills, 2,000 tons; reapers and binders, 2,000 tons; mowers, 2,000 tons; horse forks, 2,000 tons; horse rakes, 2,000 tons; winnowing machines, 50,000 tons; root cutters, 10,000 tons; chaffers, 15,000 tons; churns, 50,000 tons; carts and vans, 100,000 tons.

Hides and skins.—Tanning material, tanned hides and skins, for belting and industrial purposes, 500 tons; for boot making, sole leather, 300 tons; for uppers, 450 tons; leather belting, 500 tons.

Outer garments for men, women, boys and girls, material cheap and durable, obtainable quickly in large quantities.

Stoves.—Plain, light type suitable for bituminous or anthracite. Knock-down form. Standard sizes.

Cooking utensils.—Plain, strong kitchen utensils, cheap and durable.

Boots and shoes for men, boys, women, girls and children. Must be cheap, of heavy leather.

Furniture.—Wooden tables and chairs, metal bedsteads, cheapest materials chipped knock-down.

SENDING WIRELESS VIA UNDERGROUND

**Navy Department Lets Out Secret That
Has Been Closely
Guarded**

How underground and through-water wireless was put into practical use during the war was disclosed by Navy Department officials at Washington, giving to the public another of its secrets, carefully guarded so long as it might be of value to the enemy. Government officials regard this development, originated in private research by James H. Rogers, a scientist, of Hyattsville, Md., as one of the war's major scientific advances of the kind.

In practical use, the new system so far is employed only for receiving. Radio messages sent out from powerful stations in Europe are now being read at underground receiving stations in the United States, and in some cases, better than when caught by the elaborate and expensive air stations.

In addition, it was revealed at the Department, through an adaption of the Rogers theory, submarines under water are intercepting radio signals sent from shore, and with crude apparatus the scientist has succeeded in transmitting signals two miles, from a submerged wire.

EVENTS OF THE WEEK IN MONTREAL

At a meeting of the Montreal Canadian Club last week, Major R. T. MacKeen, district vocational officer of the Department of Soldiers' Civil Re-establishment, gave an address in which he outlined the successful work that was being achieved by the department. In the course of his talk, Major MacKeen, himself a returned soldier, emphasized the essential necessity of close and willing co-operation between the industrial establishments and the military authorities, in order that the returned men be given every opportunity to make good.

It is expected that the St. Malo shops of the Canadian National Railways at Quebec will soon be in operation. D. B. Hanna, chairman of the Board of the C.N.R., has intimated this in a letter to the Quebec City Council.

According to a statement made by T. C. Denis, superintendent of mines for the Province of Quebec, the mining industry of the province has undergone marked changes during the period of the war. The production of substance needed for war purposes has shown remarkable development, the approximate value of the materials produced going from about 13 million dollars in 1914 to an esti-

GERMAN POTASH MONOPOLY GONE

**Britain Experimenting to Get Needed
Materials From Blast
Furnaces**

Political conditions have been responsible for a heavy fall in mining shares in Essen and elsewhere in Germany, a leading cause being the uncertainty prevailing with regard to the potash resources of Alsace, it being understood that the reversion of the Alsatian potash mines to France would break down the German potash monopoly. The Allies command all the raw material needed by the chemical industry except potash; thus the restoration of Alsace-Lorraine is a matter concerning not France alone, but all the Allies. However, steps are now being taken in England with a scheme for recovering potash on a commercial scale from the blast furnaces used in the manufacture of pig-iron, the scheme being approved last year. The British Ministry of Munitions has encouraged the installation at various iron-works of gas-cleaning plant designed to extract from the furnace gases, potash-bearing dust. Certain of these plants are now in operation, others are under erection, while others again are in course of construction. A factory has also been erected at which muriate potash, free from deleterious impurities, is being manufactured from such dust. This factory is capable of dealing with all the dust that can be collected by the gas-cleaning plants now under erection and construction. As other gas-cleaning plants are installed it is proposed to erect other factories in suitable localities.

mated value of 17 million dollars for the year 1918.

An interesting description of the Canadian National Reconstruction groups for dealing humanely with the problems of returned soldiers and reconstruction matters generally, was given last week before Montreal Metallurgical Association by Mr. Warwick Chipman, K.C., chairman of standing committee of groups, of which 150 had already been formed in the Dominion, voluntary and as a matter of social service. Considerable discussion followed the address, with a talk on reconstruction that traversed wide grounds, including the housing, living conditions and wages. At the conclusion of the meeting it was decided to aid in forming further groups in Montreal along the lines advocated by the speaker.

The Eastern Brass Foundry Company, with office and works at 387 Clark St., and foundry at 40 St. Vincent St., has been organized to carry on all kinds of brass and bronze casting work and also machining. The foundry has a capacity of two tons per day. In addition to carrying on the general foundry work, the company will act as metal merchants in all kinds of metals, and iron and steel.

The new factory of Crane, Limited,

now being erected at Cote St. Paul, Montreal, is rapidly nearing completion, one portion being almost finished. The main building is well advanced and with favorable weather conditions will be completed early in the Spring.

The members of the Belgian Chamber of Commerce, of Montreal, are developing plans to materially assist in the restoration of their mother country, and aid in returning her to that state of intensive economic activity for which Belgium was standing so prominently among the nations before the war. Better trade relations between Belgium and Canada are to be the basic principles of contemplated action. The board of directors for the present year are: Gustave Francq, president; Gh. Helen, vice-president; T. Braen, secretary; H. Hicquet, treasurer; J. B. Boulanger, assistant secretary; J. Mignolet, Ed. Backhoven, P. A. Seyewetz and A. Du Castel, commissaries; M. Simpson and H. Bernard, auditors.

Last week the express companies of the City of Montreal came to an agreement whereby the former guarantee free delivery to a greater area within the city limits. The city's application has not been granted in full, but a scheme has been proposed which virtually coincides with the request of the city. The plan advanced is on the basis of population, in relation to predetermined zones of one-sixteenth of a square mile in area, or in blocks one-quarter of a mile square. The proposition, however, will require to have the ratification of the Railway Board, and to be effective the latter will have to issue an order enforcing it.

The "annual" bursting of the thirty-inch water main on St. Antoine St. took place last week, flooding a number of streets and a large area in the vicinity of the Grand Trunk Bonaventure Station. Two hours elapsed before the water could be turned off and drained from the streets, during which period all traffic was practically suspended.

W. H. Rosevear, Canadian manager of the Independent Pneumatic Tool Co., is on a business trip through the West. He is expected back to Montreal about the 28th of the month.

The Canadian Railway Club will hold their annual dinner on Saturday evening at the Windsor Hotel, Montreal.

Mr. Morley L. Smith, of 365 Grace street, director of engineering at the Toronto Technical School, died instantly on Saturday while examining parts of a boiler in the boiler-room, which he had been told were in need of repair. It is believed that he was electrocuted. "He was in the boiler-room examining parts of the boiler. He carried an extension light from the Hydro service, and crawled under the boiler. He called for assistance, and when he was taken out by the workman who was with him, he was dead," said Principal A. C. McKay. The late Mr. Smith graduated in electrical

engineering from the Faculty of Applied Science, University of Toronto, in 1912, with honors. He was a member of College Street Methodist Church, and is survived by his wife and three children. His mother, who resides in New Westminster, B.C., Dr. J. A. Smith, a brother, also of British Columbia, and Lieut. C. C. Smith, a brother, who is in command of a British destroyer in the Mediterranean, also survive him.

Before joining the staff of the Technical School, Mr. Smith was associate editor of technical papers with the MacLean Publishing Co., working particularly on "Power House" and "Canadian Machinery."

TOMCO BEARINGS
For Heavy or Light Service
Last a Lifetime
Tolland Manufacturing Company, Limited
1167 Carriacres Street, Montreal

BERTRAMS LIMITED
Engineers
Sciennes, EDINBURGH
PAPER MILL MACHINERY
and
MACHINE TOOLS for IRON WORKERS
Catalogues offered to Purchasers

OVENS
Japanning and Varnishing Ovens
heated by Gas, Electricity,
Steam or Coal.
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Ovens, trucks, casters, etc.
Write for Booklet.
Brantford Oven & Rack Co., Ltd.
Brantford, Canada.

CASTINGS
Medium Weight Grey Iron, Brass, Etc.
JOBGING
GREENLEAFS, LIMITED
Belleville, Ontario

PATENTS FOR SALE
Two Canadian Patented
Steam Specialties for
sale; one Steam Trap,
Patent Number 187215,
and one Steam Separator,
Patent Number 183340.
Allentown Experimental Works
Allentown, Pa., U.S.A.

The Financial Post on The Tariff

THE Government is disposed to let the tariff alone during the coming session. This is the advice of THE FINANCIAL POST'S Ottawa representative upon a matter which is to-day very important in the commercial and industrial situation. However, there is one factor for uncertainty. The course of the Government may be changed by political currents; if the low tariff element, which is dominated by Western Canadian sentiment, can make a strong enough case, the 7 1/2 per cent. extra war tax may be removed.

There is just one point to emphasize a fact generally ignored by those who contend for tariff reduction and that is that in Canada the tariff—a tariff which has for years been maintained by both political parties when in power—is primarily a tariff for revenue. The war has increased the country's financial burdens and the need for funds. The weakness of the argument for tariff reduction or free trade is that those who so advocate have no suggestions as to a practical form of direct taxation to supply the necessary money for carrying on the country's affairs.

Besides the important leading article of which the above sentences are a part.

THE POST

THIS WEEK CONTAINS:

Shipments of Flour Held Up
Readjustment of Prices Will Come Gradually
Proposal for French Exhibition Train Should be Able to Supply More of Our Own Needs
Made-in-Canada Brand Popular With the English
King Edward Hotel May Pay Dividend \$7,300,000 Issue to Retire Old Tramways Notes
Labor the Big Factor in Future of Consolidated
Packers Worked on Small Margin During 1918
Holdings of U.S. Steel in Canada Being Reduced
Bank Stocks Still in the Limelight
Bookkeeping for the Housekeeper
Keeping an Eye on the Retailer and His Affairs
Make States' Banking System Like Canada's
Canada's Railways and State Control
Fair Business Being Done in Bond Market
Montreal Bonds Are Now Listed on Exchange
Fine Showing by Canadian Life Companies
National Life Moves Forward Conservatively
Bottoms Are Not Available for Export Trade
Employers Show Desire to Learn Labor Viewpoint

Above mentioned are a few of the more important contents of this issue of THE FINANCIAL POST. Send a subscription to THE POST and note its business value to you. Use this form in sending subscription which is \$3.00 per year.

The MacLean Publishing Co.,
143-155 University Ave., Toronto.

Send me THE FINANCIAL POST every week till further ordered. I will pay subscription price \$3.00 per year on receipt of bill or you may draw on me for this.

Name

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C.M.

INDUSTRIAL CONDITIONS FOR THE YEAR REVIEWED BY OFFICIAL

Commissioner of Industries and Publicity C. W. Kirkpatrick presented to the Board of Control to-day a report covering the work of the department from April last, when he assumed office, until the end of the year. Among the concerns that made large additions were the Dominion Foundries & Steel Co.; the Steel Co. of Canada, which completed a \$3,000,000 coke oven plant and has started work on a modern office building; the Westinghouse Company completed its handsome office building, the Canadian Cotton Co., Imperial Oil Co., Hamilton Bridge Co., Armour & Co., Slater & Barnard, Swift-Canadian Co., Hamilton Cotton Co., Brown-Boggs Co., Frost Wire Fence Co., Imperial Cotton Co., Canadian Cartridge Co., Wagstaffe, Ltd., and J. R. Moodie & Sons. These additions mean under normal conditions, the employment of upwards of 1,000 additional hands.

The Ford-Smith Co. also erected a large new factory building, doubling its former capacity. Besides the additions referred to, the following industries commenced operations during the year: The Monarch Metal Co., at the end of Main street west; Glendale Spinning Mills, Glendale avenue; the Fox Chain Co., Earl street, and the Canadian Toys, Ltd., Sherman avenue. These four new industries represent an invested capital of about \$1,000,000, and under normal conditions will employ from 800 to 1,000 hands.

During the year several new lines of

manufacture were added to Hamilton's already lengthy list. The Wagstaffe Co. erected a large new building for the manufacture of candied peel, it being the first concern of its kind in Canada. The Canadian Cartridge Co. have also put up a new building for the manufacture of steel barrels and containers, and now that the work on munitions has ceased, is developing this branch of its business. The Wentworth Manufacturing Company, which took over the holding of the old Wentworth Brass Co. started to manufacture a number of household specialties not heretofore manufactured in Hamilton, and many other local industries added new lines during the past year.

FERRY BOAT HAD TERRIFIC BATTLE

Had to Weather Gale That Was Blowing
From 60 to 85 Miles
Per Hour

The big G.T.R. ferry, Ontario No. 1, which was on the way from Charlotte, N.Y., to Cobourg, had to battle with a heavy storm recently. The wind, it is said, in mid-lake, was at from 60 to 85 miles an hour, and the waves rolled very high. The open end of the ferry is but eight feet above the water, and great quantities of water were shipped, putting out the fire under two boilers and flooding out the men's quarters. Only the fact that there were 28 loaded

"HAWK" D CHROME VANADIUM STEEL

You Know How Greatly it Increased Production

You know how it proved to be without equal for both first and second operation punches—how, in both Canadian and American shell plants, this heat-treated ready-for-use steel enabled each punch to turn out over 2,000 shells.

Hawkrider Brothers' steel for every commercial requirement is just such production-increasing steel as proved this "Hawk" D. Chrome Vanadium. We make

Steel of Every
Description

Hawkrider Brothers Company

303 Congress St., BOSTON, MASS.
U. S. A.

'Barnes-Made' Springs

are unusual in
service and wear.

They are the result of sixty years' experience, unsurpassed equipment and highly skilled workmanship.

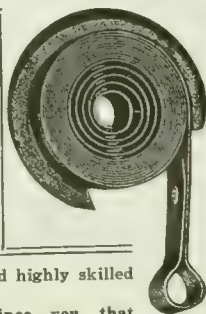
A trial will convince you that "Barnes-Made" Springs are the best buy.

Established 1857.

THE WALLACE BARNES COMPANY

218 South St., Bristol, Ct., U. S. A.

Makers of "Barnes-made" Products
Springs, Screw Machine Products, Cold Rolled Steel and Wire



Ottawa Finds It Pays to Advertise

Now, when this country faces so many great issues, it would be a grave error indeed if that potent force, advertising, so successfully utilized by the Government to overcome its war-time problems—was not employed to the fullest extent in solving our peace-time difficulties.

Do you know how publicity helped to register 5,000,000 people in one day—
How it turned a nation into bond-buyers—
What it accomplished in food conservation—
How it eliminated waste and increased production—
How it aided administration of war measures?

If you do not—then read Mr. William Byron's article, "Ottawa Makes a Discovery," in the January issue of MACLEAN'S. Mr. Byron's article is not a cut and dried discussion of advertising, but a remarkable story of achievement. It proves by facts that through publicity, Canadian energies can be combined into mighty forces, that will help solve our peace-time problems.

READ IT IN MACLEAN'S

Over 65,000 Canadian Families Buy

MACLEAN'S

"CANADA'S NATIONAL MAGAZINE"

JANUARY ISSUE Now On Sale
At All News Dealers

20c PER COPY. \$2.00 PER YEAR.

cars on board, keeping the ferry from rolling, prevented it from rolling over.

The ferry left the south shore at 7.30 a.m. Friday, and when ten miles out from Cobourg had to divert the course in the face of the south-west to west gale. It reached shelter in the lee of Gibraltar Point, Toronto Island, at 12.30 Friday night, and remained five hours, reaching Cobourg at 10.30 Saturday morning.

Capt. McCuaig, of Toronto, was in command. First Mate Redfern (who commanded the Boys' Naval Brigade boat this summer) said it was the worst storm in his experience. Among the few passengers were a bride and groom, and the latter was overcome by sickness.

CLAIM FREIGHT RATES MILLS MEET PRICE

**London Manufacturer Points Out Why
It is Hard For His Firm to
Compete.**

LONDON, Jan. 23—"European markets are closed to us on account of the freight rates to the seaboard," stated Charles H. White, secretary of the London Rolling Mills Company to CANADIAN MACHINERY, in reply to the question as to whether his company would seek for trade in France and Belgium. "We cannot compete with the mills that are situated at or near the seaports." The London Rolling Mills Company has been exceptionally busy during the last three years, having turned down many orders on account of its inability to fill them. It turns out 1,000 tons of bar iron and steel every month when working full time.

Mr. White says that trade has slowed down somewhat, but he anticipates that the output from the mill will be as large this year as it was during the preceding years. Sales are not heavy at present as the manufacturers to whom the steel is sold are re-adjusting their factories from war to peace goods. This will not take long, he opines, and the outlook is good.

"Will the price of steel drop again quickly?" he was asked.

"I would not care to express an opinion on this," he replied.

Referring again to foreign markets, Mr. White said that his firm had seriously considered going after the trade and it had been discussed from all angles. It was firmly decided that there would be no use trying to compete with the mills that would not have to pay the rail freight rates on account of their proximity to the seaboard.

Looking at the situation squarely, he thinks the general outlook for Canadian manufacturers is bright.

According to good authority considerably more than 3,000 technical articles, dealing with the problem of nitrogen fixation from all points of view, have appeared in English and foreign languages to date. In the same period thousands of patents pertaining to the processes have appeared.

PATENT ATTORNEYS

RESEARCH BUREAU

REPORTS BY EXPERTS ON SCIENTIFIC, TECHNICAL AND INDUSTRIAL DEVELOPMENT.
SPECIAL RESEARCHES ARRANGED.

PATENTS, TRADE MARKS, ETC

HANBURY A. BUDDEN CABLE ADDRESS
112 DRUMMOND BLDG., MONTREAL "BREVET"

PATENTS

Fetherstonhaugh & Co.,
The old established firm. Patents everywhere. Head office, Royal Bank Bldg., Toronto. Ottawa office, 5 Elgin St. Offices throughout Canada. Booklet Free.

PATENT
YOUR INVENTIONS

Send direct to Ottawa for free patentability report and booklet "Patent Protection." Clients' patents advertised in the "Patent Review."

Harold C. Shipman & Co. PATENT ATTORNEYS
CENTRAL CHAMBERS, OTTAWA, CANADA.

PATENTS
PROMPTLY SECURED

In all countries. Ask for our Investor's Adviser, which will be sent free.

MARION & MARION 364 University St.
Merchants Bank Building, corner
St. Catherine St., MONTREAL, Phone Up. 6474
and Washington, D.C., U.S.A.

Prompt Deliveries

on Gauges, Tools, Dies,
Jigs and Fixtures

Special Machinery

CUT GEARS

Contracting and Repairing
Machinists

Quotations cheerfully submitted.

Normac Machine Co.
55 Vine Street, St. Catharines, Ont.

MORTON MANUFACTURING CO.
PORTABLE PLANERS
DRAW CUT SHAPERS
SPECIAL DRAW CUT R.R. SHAPERS
FINISHED MACHINE KEYS
STATIONARY & PORTABLE KEY WAY CUTTERS
SPECIAL LOCOMOTIVE CYLINDER PLANERS
OFFICE - WORKS: MUSKEGON HEIGHTS U.S.A.

METAL STAMPINGS

We are manufacturers of stamped parts for other manufacturers.

We do any kind of sheet metal stamping that you require. Our improved presses and plating plant enable us to produce the finest quality of work in a surprisingly short time.

We can finish steel stamping in Nickel, Brass or Copper.

Send us a sample order.

W. H. BANFIELD & SONS

372 Pape Avenue, Toronto, Can.

Mackinnon Steel Co., Limited

Sherbrooke - Quebec

ENGINEERS, MANUFACTURERS AND ERECTORS OF STEEL STRUCTURES

Miscellaneous plate and structural work of every description used in connection with power plants furnished in short order. Engineering, manufacturing and erecting steel structures is our specialty. Write for prices.

PLEWES Limited

WINNIPEG
For All

Machinists' Supplies

CLASSIFIED ADVERTISING

Rates (payable in advance): Two cents per word first insertion; one cent per word subsequent insertions. Count five words when box number is required. Each figure counts as one word. Minimum order \$1.00. Display rates on application.

SECTION

POSITIONS WANTED

EXPERIENCED INSPECTOR WITH EXECUTIVE ability. If you are going in for interchangeable manufacture and desire a man familiar with the most up-to-date systems of gauging and inspection which will reduce cost of manufacture and increase output, write stating full particulars to Box 543, Canadian Machinery. (c5m)

MECHANICAL ENGINEER AND DRAFTSMAN. Now open for position in the above field, have had extensive shop experience and am especially good at machine design. Have executive ability and have gotten results from men, principally for the reason that I speak a language that they understand. I have handled correspondence, am used to meeting the public and have a good record as a salesman. There certainly is a company to whom I would be valuable. My requirements in the way of salary would be moderate until I had proven my worth. Box 545, Canadian Machinery. (c4m)

FOREMAN PATTERNAKER, TECHNICAL training. 20 years' experience in all classes of work. Foremen's references covering past seven years. Age 36. Good executive. Energetic. Alive to latest methods. Box 46, Canadian Machinery. (c5m)

MECHANICAL AND STEAM ENGINEER open for appointment as plant engineer in an industrial plant or shipyard. Sound practical man with good initiative and executive ability experienced in the maintenance and installation of medium and heavy machine tools, steam and air lines, transmission, etc. Age 37. Seventeen years' engineering experience, and held position as above in a large shipyard for seven years with marked success. Correspondence invited to Post Office Box 1965, Montreal. (c5m)

Immediate Deliveries

- 1—No. 70 NEW Curtis Pipe Machine with cabinet base and automatic cut-off. Range—14 to 2" pipe R. & L. —38 to 2" bolts R.H. Complete with dies.
- 1—2 1/4" USED Gridley Automatic single spindle.
- 10 3"-4"-5" x 4" Air Hoists.
- 2 Racine Power Hack Saws.
- 2—J. & L. Turrets 3 x 36.

Charles P. Archibald & Co.

Machinery and Supplies

164 St. James St. - Montreal

SITUATIONS VACANT

WANTED—A FIRST-CLASS DRAFTSMAN—one with experience on spiral and bevel cut gears preferred. State experience and salary expected. Apply McKinnon Industries, Ltd., St. Catharines, Ont. (c4m)

WANTED FOREMAN FOR TANK SHOP employing 40 to 50 men. All classes of plate work, except boilers. Western Canada. Box 543, Canadian Machinery. (c5m)

FOR SALE

2 MOTOR DRIVEN COMPRESSORS, 329 FT. 2 Frog & Switch Planers. 2 Rail & Frog Fillet Multiple Drills. 2 Newton Cold Saws. Nos. 501 and 502. J. L. Neilson & Co., Winnipeg, Man. (ctfm)

FOR SALE—300 PIECES COLD ROLLED shafting, 2" rd. x 8 1/4", in fair condition. Price on application. Also several items Rivets, Bolts and Steel. Complete list on application. John Deere Mfg. Co., Ltd., Welland, Ont. (c26m)

ONE SECOND-HAND JENCKES CORLISS EN-gine 12" x 30". Cut, description and price on application to Canadian Ingersoll-Rand Co., Limited, Toronto, Ont. (ctfm)

TWO NEW STEAM TURBINE BLOWERS for blast or cupola use. Size and particulars on application or can be seen running. Apply to Box 141, Tilbury, Ont. (c7m)

ONE CLAYTON 6" x 8" x 6" AIR COMPRES-sor in first-class condition. W. G. Utley, Machinist, Yarmouth, N.S. (c8m)

SPECIAL MACHINERY

MANUFACTURERS—WE CAN UNDERTAKE work to any specification—munition production equipment or otherwise. Write W. H. Sumbuling Machinery Co., 7 St. Mary St., Toronto (ctfm)

MACHINERY WANTED

SIX-FOOT RADIAL DRILL FOR BOILER shop; lathe to take in 12' between centers; air hoist, 10" cylinder, 4' lift with trolley; vertical air receiver, 44" inside dia., 14' high. The National Shipbuilding Co., Ltd., Goderich, Ont.

WANTED—TWO 100 H.P. RETURN TUBULAR boilers, 16 or 18 feet long, 80 to 100 pounds pressure. State price and where can be seen. Box 548, Canadian Machinery. (c4m)

VERTICAL BORING MILL, 48 IN. OR 52 IN., either new or used. Must be in first-class condition. Apply E. A. Lowry, Power Equipment, Guelph, Canada. (c4m)

HYDRO MOTORS WANTED
TEN TO THIRTY HORSEPOWER. QUOTE prices and give full particulars. St. Marys Wood Specialty Co., Limited, St. Marys, Ont. (c4m)

POSITIONS WANTED

MASTER MECHANIC OR SUPERINTENDENT of 25 years' experience, with new and repair work and in manufacture of tool, mill, marine, mining machinery, gas and tractor engines, and installing equipment. Well versed in automatic, semi-loading and turret lathes. Also general machine tools. Designer of special machine tools and jigs. Thorough mechanical ability. Good executive. Progressive. Can get results and can produce your goods at lowest possible cost. Can handle labor situation well to advantage. Box 547, Canadian Machinery. (c4m)

FIRST-CLASS MECHANIC, EDUCATED. MAR-ried. 15 years' experience in practice and technique, desires to connect in above capacity with firm manufacturing traction and other farm engines for South, Central America or West Indian trade, with view to travelling afterwards in their erection, demonstration or sales anywhere in above territory. Am native of West Indies and have travelled South America; know the language and people, hence possess an advantage. Highest references. Box 550, Canadian Machinery. (c7m)

PATTERNS

TORONTO PATTERN WORKS, 65 JARVIS Street, Toronto. Patterns in wood and metal for all kinds of machinery. (ctm)

When writing
to advertisers
kindly mention
this paper.

NOW!

You've been going to send
in that ad for weeks, so
why not mail it now for
next week's issue.

Canadian Machinery
143-53 University Ave., Toronto

WILLIAMS' CONDENSED LIST MACHINE TOOLS

ENGINE LATHES

14" x 5' LEBLOND Standard.
14" x 6' McKENZIE Standard, new.
14" x 7' HENDEY taper and draw in attachment.
16" x 8' CISCO, D.B.G., Q.C.G., new.
16" x 8' LEBLOND, D.B.G., Q.C.G., oil pan, turret on bed.
19" x 10' LEBLOND, heavy duty, new.
22" x 10' LODGE & SHIPLEY, geared head, Q.C.G., oil pan.
24" x 12' C.M.C., D.B.G., Q.C.G., new.
38" x 10' CONRADSON, geared head, new.
14" x 22' BERTRAM, compound rest.
36" x 25' LONDON Gap Lathe, compound rest.

MILLING MACHINES

No. 12 BROWN & SHARPE, plain.
No. 2 CINCINNATI Universal.
No. 25 OSTERLIN, heavy duty, new.
No. 22 and No. 4 LEBLOND Universal, new.
No. 2B HENDEY Universal, new.
No. 3 CINCINNATI, plain.
No. 4 LEBLOND, plain, heavy duty.

SHAPERS

15" McKENZIE, back geared, crank, new.
16" RAE, B6, back geared, crank, new.
16" and 20" KELLY, B.G., crank, new.
16", 24" and 28" GOULD & EBERHARDT, high duty, new.
36" CANADA MCHY. CORPN., E.G., crank, new.

PLANERS

52" x 52" x 16' CANADA TOOL WORKS, one head.
40" x 42" x 20' PUTNAM, one head.
42" x 42" x 16' NEW HAVEN, one head.

30" x 30" x 10' BERTRAM, one head.
24" x 21" x 6' BERTRAM, one head.

DRILLS

No. 315 BAKER, heavy duty.
CINCINNATI-BICKFORD, heavy duty.
28" and 34" BARNES, sliding head.
20", 22½", 25" BARNES, stationary head.
22½", 28" and 30" SIBLEY, new.
15" BARNES, geared.
10" and 14" PERFECT & McKENZIE, sensitive.
14" LELAND GIFFORD & AVEY, sensitive.

RADIAL DRILLS

5' BICKFORD, motor drive.
16" CINCINNATI-BICKFORD, speed box drive.
2' FOSDICK, National type.

GRINDERS

12" x 52" LANDIS, plain, self-contained.
6" x 18" LANDIS, plain, self-contained.
18" x 96" NORTON, plain.
No. 1 LEBLOND Universal.
No. 2 OAKLEY Universal.
No. 1 CINCINNATI Universal.
WING, hand surface.

CUTTING-OFF MACHINES

6" Williams, new.
6" Globe, new.
4" Davis.
3" Williams.
3" Hurlbut-Rogers.

GEAR-CUTTING MACHINES

36" Hewes & Philips.

The A. R. Williams Machinery Co., Limited
64 Front Street West - TORONTO

**A
MAN**

was wanted as Tool-room Foreman. He was found by a condensed ad. in

CANADIAN MACHINERY

Classified Advertising Section

143-153 University Ave., Toronto

USED MACHINERY

In stock at New Glasgow and offered for sale:

- 1 "Bullard" lathe 20x12'-0"
- 1 "Curtis" air hoist 8"x4'-0"
- 1 "Matheson" hydraulic press 14"x24"
- 1 "Sturtevant" volume blower, No. 7
- 1 "Grant" riveting hammer, belt driven (NEW)
- 1 "Berlin" hardwood flooring planer and matcher, No. 88.

Write for particulars and prices.

I. MATHESON & CO., LTD.
Builders of Machinery
New Glasgow, Nova Scotia
tf

USED MACHINERY

In stock at Moncton, N.B., and offered for sale:—

- 5—18" x 8' Mueller Engine Lathes.
 - 6—26" x 10' Bertram Lathes.
 - 2—22" x 10' Bertram Lathes.
 - 1—16" x 6' American Toolroom Lathe.
 - 4—3½" x 36" Acme Turret Lathes.
 - (All modern lathes)
 - 1—No. 2 Kempsmith Universal Milling Machine.
 - 4—6" Hall Cutting-off Machines.
 - Also
 - Belting, Shafting, Pulleys, Hangers, Pumps, Air Compressors, Grinders and Furnaces.
- For particulars, write or apply at

**RECORD FOUNDRY AND
MACHINE CO.**
Shell Dept.,
MONCTON N.B.

Riverside Machinery Depot

LATHES

- 1—28 x 14 Fay & Scott Engine Lathe. Used.
- 1—26 x 14 P & W Standard Engine Lathe. Used.
- 1—24 x 12 Perkins Blocked Engine Lathe. Used.
- 1—24 x 12 Springfield Ideal H.D. Engine Lathe. New.
- 1—21 x 10 Porter Standard Engine Lathe. New.
- 1—20 x 10 W & B Gear Head Lathe. Used.
- 1—18 x 8 LeBlonde Engine Lathe. Used.
- 1—18 x 8 Springfield Ideal G.H. Tool Lathe. New.
- 1—16 x 8 L & S Q.C. Engine Lathe. Used.
- 1—16 x 8 Porter Standard Engine Lathe. Used.
- 1—16 x 6 American Q.C. Engine Lathe. Used.
- 2—16 x 6 Filsmith Q.C. Lathes. New.
- 1—15 x 6 South Bend Standard Lathes. New.
- 1—7 x 12" Precision Bench Lathe. (Potter).

TURRET AND SCREW MACHINES

- 1—18 x 6 Springfield Fox B.G. Turret Lathe. Used.
- 1—14 x 5 Hendy Turret Lathe. Used.
- 3—12 x 4 Warner & Swasey Turret Lathes. Used.
- 1—12 x 4 B & O Turret Lathe. Used.
- 1—12 x 4 Pearson Turret Lathe. Used.
- 2—No. 107-11" Wells & Son Turret Lathes. Used.
- 1—28" N. B. & P. Rigid Turret Lathe. Used.
- 1—14" Warner & Swasey Turret Lathe. Used.
- 2—3 x 36 J & L Flat Turret Lathes. Used.
- 1—No. 2 Warner & Swasey Hand Screw Machine. Used.
- 1—No. 2 S & K Hand Screw Machine. Used.
- 2—No. 3 S & K Screw Machines. Used.
- 1—34 Cleveland Automatic Screw Machine. Used.
- 2—2" Cleveland Automatic Screw Machines. Used.

- 1—No. 515 4-Spindle National Acme Automatic. Used.
- 4—No. 52 4-Spindle National Acme Automatics. Used.
- 1—No. 53 4-Spindle National Acme Automatic. Used.
- 1—4¼ Girdley Automatic. Used.

SHAPERS AND MILLERS

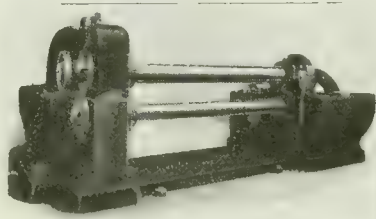
- 1—25" Springfield H.D., B.G. Crank Shaper. New.
- 2—16" Springfield B.G. Crank Shapers. New.
- 2—24" Milwaukee B.G. Crank Shapers. New.
- 3—20" Milwaukee B.G. Crank Shapers. New.
- 1—16" Milwaukee B.G. Crank Shaper. New.
- 2—20" Columbia Crank Shapers. New.
- 1—16" Fox Crank Shaper. Used.
- 1—16" Hendy Geared Shaper. Used.
- 2—14" Hendy Friction Metal Shapers. Used.
- 1—No. 1 U.S. Hand Miller. New.
- 1—No. 1 Garvin Hand Miller. New.
- 1—No. 1 Burke Bench Miller. New.
- 1—No. 3 Burke Bench Hand Miller. New.
- 1—Warner & Swasey Milling Machine. Used.
- 2—No. 0-B Fox Milling Machines. New.
- 1—No. 1 Dow B.G. Plain Milling Machine. New.
- 1—Fosdick 3½" Horizontal Miller. Used.
- 1—No. 10 Beeman & Smith 3½" Horizontal Miller. Used.
- 1—60" Bickford Vertical S.H. Miller. Used.

GRINDERS AND PLANERS

- 2—No. 4 Clizbe Bench Casting Grinders. New.
- 8—No. 3 Clizbe Casting Grinders. New.
- 3—No. 2 Clizbe Casting Grinders, on stand. New.
- 1—No. 3 Champion Bench Casting Grinder. New.
- 3—No. 0 Champion Bench Casting Grinders. New.
- 1—No. 3 Detroit Floor Casting Grinder. Used.
- 1—1¼ x 45" Standard Low Floor Casting Grinder. Used.
- 1—No. 14 Double End Pedestal Casting Grinder. Used.
- 1—Iron Foundry Builders' Pedestal Casting Grinder. Used.
- 1—8 x ¾ Casting Grinder on stand. Used.
- 1—American Drill Grinder. Used.
- 1—W & M Tool Drill Grinder. Used.
- 1—Washburn Drill Grinder. Used.
- 1—Yankee Drill Grinder. Used.
- 2—W & M Yankee Drill Grinders. New.
- 1—No. 20 Landis Plain External Grinder. Used.
- 1—No. 60 Heald Cylinder Grinder. Used.
- 1—No. 2½ Woods Universal Tool and Cutter Grinder. Used.
- 1—No. 1 Thomson Universal Tool and Cutter Grinder. New.
- 1—Cutter and Reamer Grinder. Used.
- 1—4-A Gorton Universal Disc Grinder. Used.
- 1—24" Disc Grinder Press. Used.
- 1—No. 34 Horizontal Disc Grinder. Used.
- 1—Temco Electric Grinder on Pedestal. New.
- 1—Temco D Electric Motor Grinder. New.
- 1—Temco G Bench Electric Grinder. New.
- 1—Van Dorn Portable Electric Grinder. Used.
- 1—Hand Electric Grinder. New.
- 1—P-Tool Electric Grinder. Used.
- 1—Dumore A T P Grinders. New.
- 1—Dumore R T P Grinders. New.
- 1—Dumore G A C Electric Type Grinders. New.
- 3—Dumore Jr. Electric Grinders. Used.
- 1—No. 1 Landis Internal Grinder. Used.
- 1—Morse Face Grinder. Used.
- 1—28 x 7 Planer Type Surface Grinder. Used.
- 1—No. 6 Bryant Chucking Grinder. Used.
- 1—32 x 45 x 13 3" Patch 2 Head Open Side Planer. Used.
- 1—46 x 40 x 15 2" Patch 2 Head Open Side Planer. Used.
- 1—44 x 34 x 11 4" Line In 2 Head Open Side Planer. Used.
- 1—24 x 24 x 6 Wilson Metal Planer. New.

RIVERSIDE MACHINERY DEPOT
25 St. Aubin Ave., Detroit, Mich.

8 ft. Lennox, Double Housing Type, Splitting Shear, capacity $\frac{3}{4}$ -in. belt drive.



This machine is designed for straight shearing of sheets and plates and can be efficiently used for cutting round and square or flat bars.

DRILLS

- 3 20" Ryerson Rockwell.
- 1 28" Ryerson Sibley Sliding Head.
- 1 4' Ryerson Radial Drill, Gear Box.
- 1 24" Ryerson Sibley Sliding Head
- 1 30" Ryerson Sibley Sliding Head.

Some New Machines In Toronto Stocks

LATHES

- 1 16 x 7' South Bend Screw Cutting Engine Lathe.
- 1 18 x 8 Ryerson Milwaukee Engine Lathe, 3-step cone, D.B.G., Q.C. feed.
- 1 24 x 10 Ryerson Milwaukee Engine Lathe, 3-step cone, D.B.G., Q.C. feed.
- 1 18 x 8 Ryerson Cincinnati Engine Lathe, 3-step cone, D.B.G., Q.C. gear box.
- 1 20 x 10 Ryerson Cincinnati Engine Lathe, 3-step cone, D.B.G., Q.C. gear box.
- 1 24 x 12 Lodge & Shipley Engine Lathe, 3-step cone, D.B.G., Q.C. gear box.

MILLING MACHINES

- 1 Ryerson-Owen No. 3 Universal, belt drive.
- 1 Ryerson-Conradson No. 3 plain, belt drive.

SHEARS AND PUNCHES

- 1—8' Lennox, Double Housing Type, Splitting Shear, capacity $\frac{3}{4}$ " belt drive.
- 1 No. 3 Lennox Rotary Bevel Shear, arranged for belt drive, cap. $\frac{3}{4}$ ".
- 1 Ryerson Steel Frame No. 2 Hand Lever Shear, 6" blades, $\frac{1}{4}$ " capacity.

No. 3 Lennox Rotary Bevel Shear, arranged for belt drive, capacity $\frac{3}{4}$ -in.



The most efficient machine now on the market for beveling irregular and curved sheets, boiler heads, flanges, dome sheets, plates, angles, etc.

- 1 Ryerson Steel Frame No. A-6 Hand Lever Punch, 6' throat, capacity $\frac{1}{4}$ x $\frac{1}{4}$.
- 1 Ryerson Steel Frame No. C-6 Hand Lever Punch, 6" throat, capacity $\frac{1}{2}$ x $\frac{1}{2}$.
- 1 Ryerson Steel Frame No. 5-A Hand Lever Punch, 3' throat, capacity $\frac{1}{4}$ x $\frac{1}{4}$.
- 1 Ryerson Steel Frame No. O-A Hand Lever Punch, 3" throat, capacity $\frac{1}{4}$ x $\frac{1}{4}$.

Garlock-Walker Machinery Company, Ltd.

Winnipeg

32-34 Front Street
TORONTO

Montreal

High Class Machine Tools and Equipment for sale

We are completing our contract for Aeroplane Engines for the British Government and have for disposition, subject to prior sale, some of the finest type of Machine Tools and equipment in Canada, of Standard design and adapted to any class of fine work. These machines were procured especially for Aeroplane Engine Work, and are not needed for our regular automobile program.

The machinery is practically new, having been used but for a few months, and some machines have never been set up or used.

This list consists of Engine, Turret and Bench Lathes; Milling Machines, Shapers, Screw Machines, Planers, Single Spindle, Multiple and Radial Drills; Boring Machines, Grinding Machines, Slotters, Electric Motors, Blowers, Exhaust Fans, Welding Outfits, Chain Blocks, Chucks, Cutters, Reamers, Drills, Taps, Micrometers and Dial Indicators, and other fine measuring instruments, Tools, also raw materials and supplies of tool steel, High Speed Steel and Alloy Steels.

Lists of the above equipment will be supplied to intending purchasers upon application, and any of the equipment can be seen and inspected at our plant in West Toronto.

Willys-Overland Limited

WEST TORONTO

ONTARIO

The Entire Equipment of the British Munitions Co. **FOR SALE**

Lathes, Drills, Grinders, Furnaces, Punch and Shears, Milling Machines, Twist Drill Grinders, High Speed Hack Saws, Blowers, Compressors, Hydraulic Pumps, Motors, Arbor Presses, Bliss Presses, Oil Tanks, Electric Drills, and a very large number of Machine Tools.

Also supplies of all kinds, including Shafting, Hangers and Pulleys, Belting, Steel Lockers, Time Clocks, Trucks, Standard and Hydraulic Valves, Pipe Fittings and Packings, Tool Steel, Twist Drills, Milling Cutters, Taps, Files, and complete machine shop equipment.

Everything offered at attractive prices. Write NOW for further information and quotations.

WILLIAMS & WILSON, LIMITED

320 St. James Street

:

::

MONTREAL, QUE.

Don't Keep It--Sell It

If you have a lathe
a drill
a milling machine
a planer
a chain block
a chuck
a motor
a crane
a stock of belting
an engine
a compressor

or any other machine shop equipment for which you really have no further use, why not turn it into *cash*?

Someone may be looking for just the machine you may want to sell. Let us bring you together.

A "classified" ad. in CANADIAN MACHINERY, costing a few cents per issue, has done wonders for others. Why not try it?

Turn to the "Classified" section in this issue and see what is being offered and what is wanted at present.

CANADIAN MACHINERY

Classified Advertising Section

143-153 University Avenue

TORONTO, ONT.

PARTIAL LIST OF TOOLS

10' Bement Vertical Boring Mill, two heads.
36" Bausch Vertical Boring Mill, two heads.
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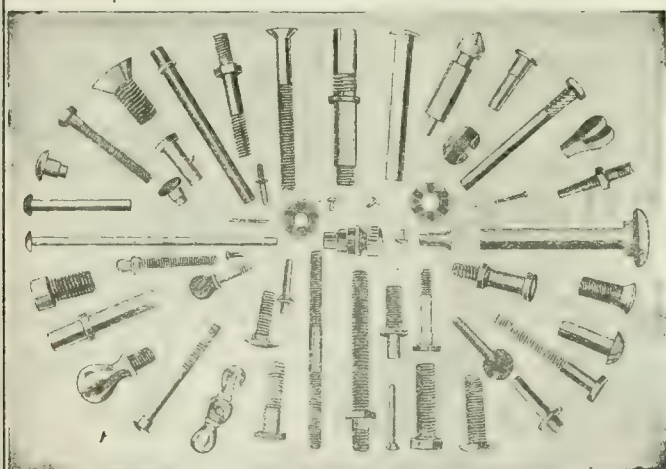
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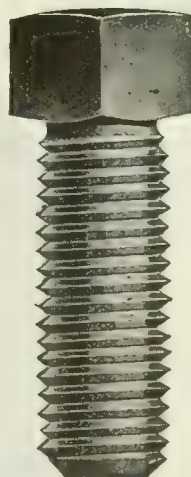
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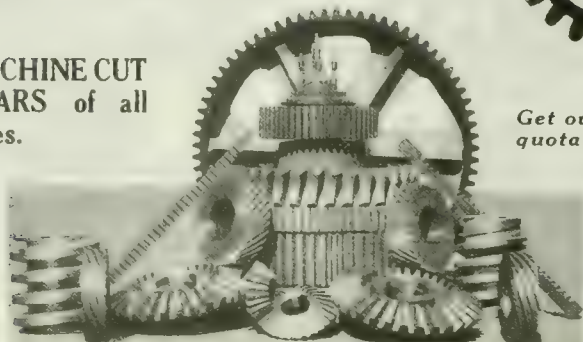
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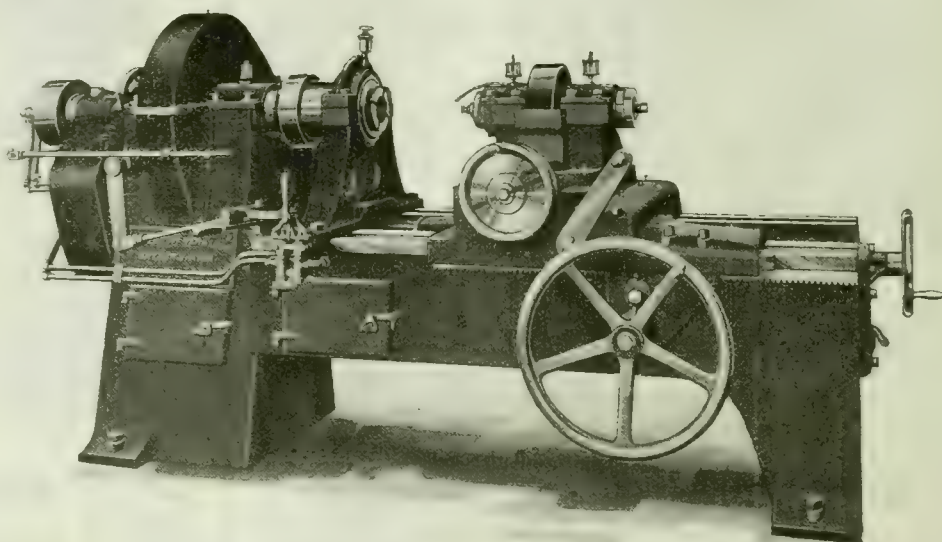
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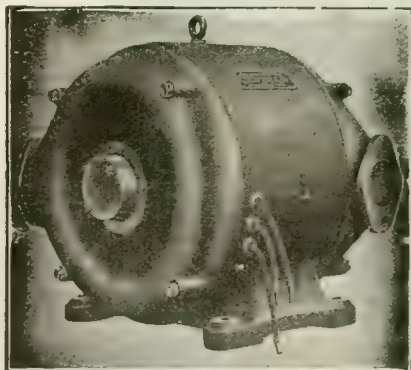
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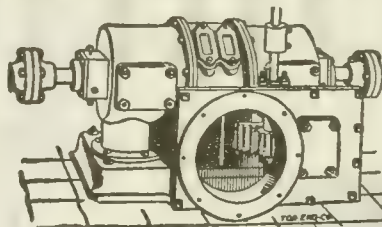
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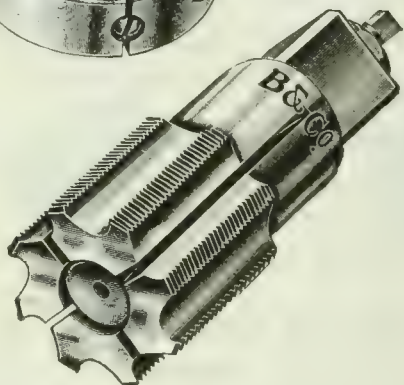
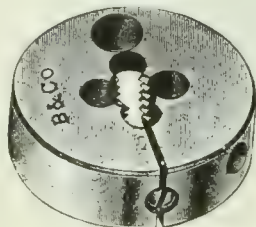
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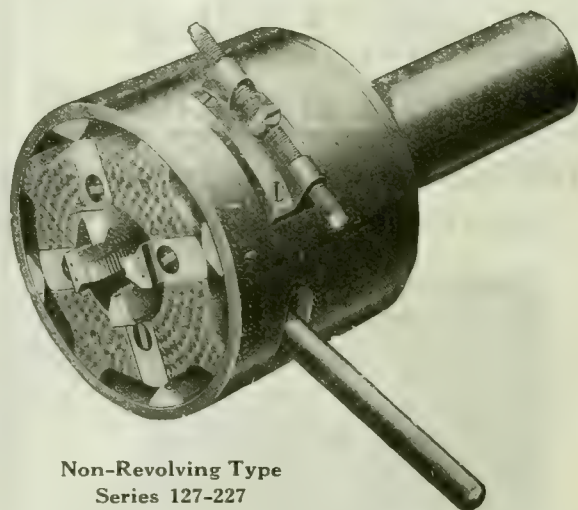
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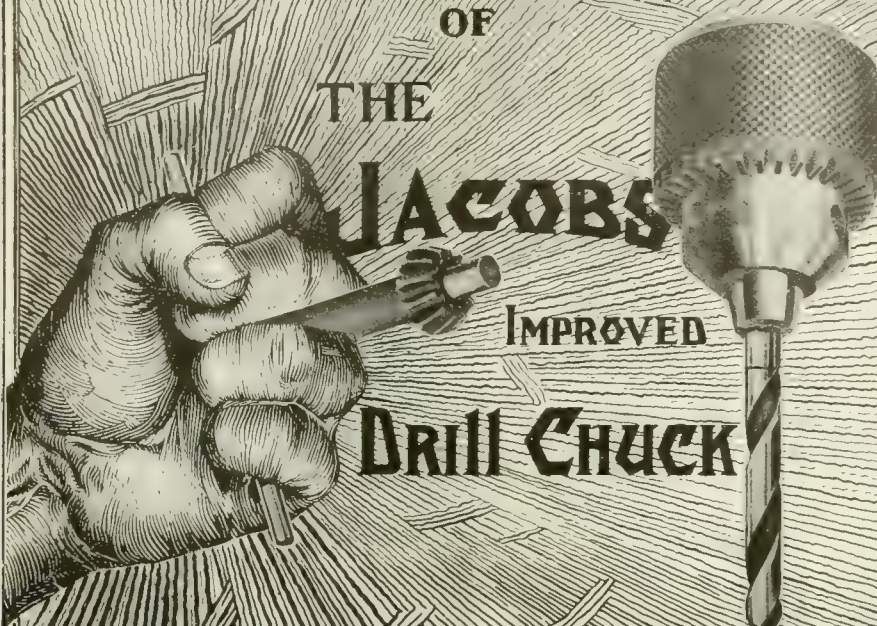
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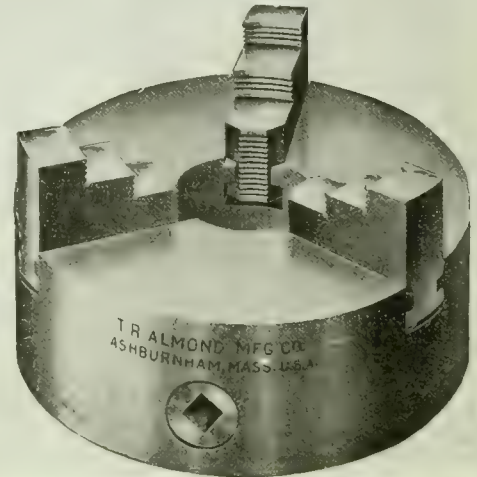
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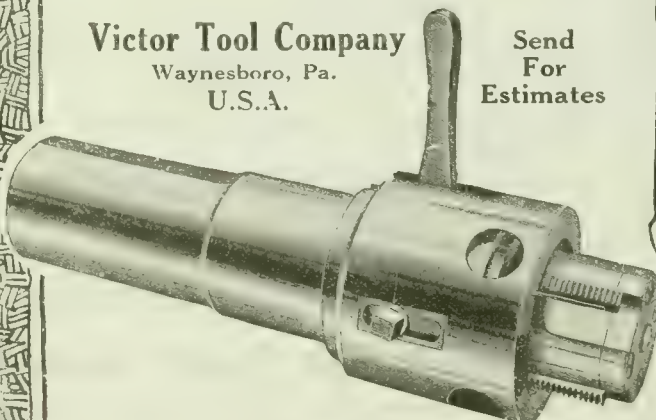
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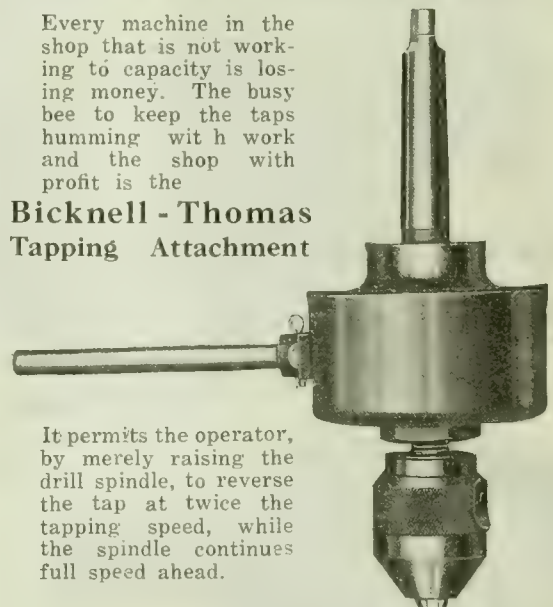
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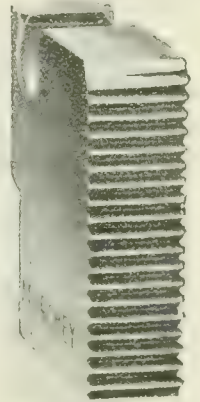


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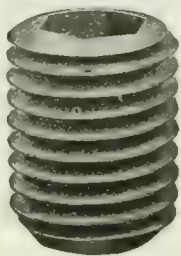


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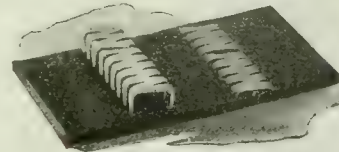
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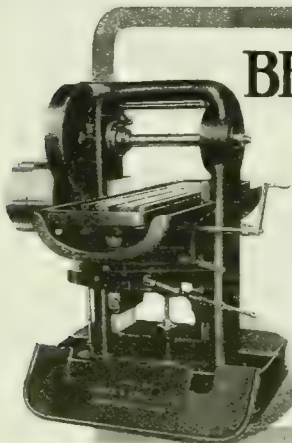
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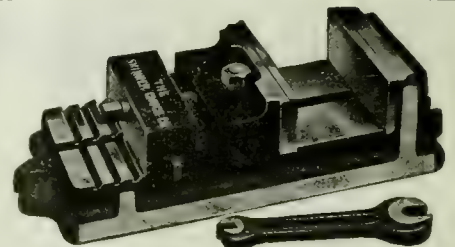
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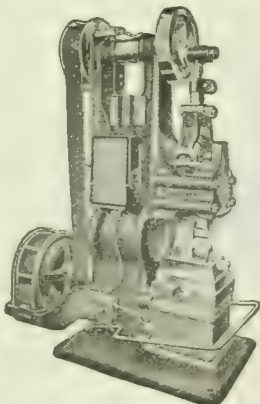


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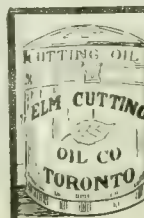
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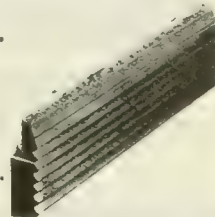
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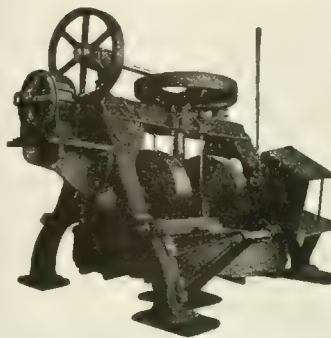
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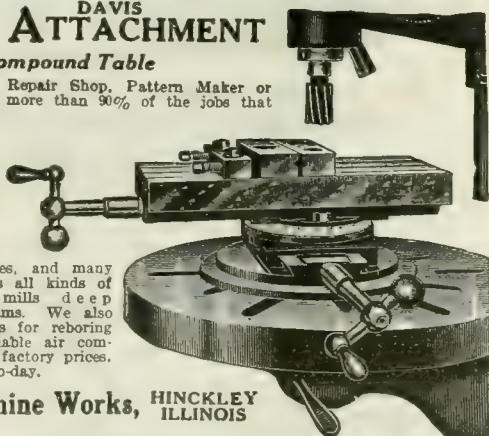
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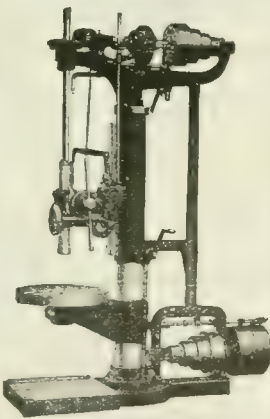


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Do you want someone to handle your small stamping work?

An advertisement in the contest section will put you in touch with firms who have the facilities for handling small stampings, small tools, jigs, fixtures, etc. If you need their help, tell them so here.

CANADIAN MACHINERY

Contract Work Section

143 UNIVERSITY AVENUE TORONTO

CLUTCHES

Combined Jaw and Friction. Friction only.
Gas Engine Clutches. Jaw Clutches.

Write for interesting printed matter.

The Positive Clutch & Pulley Works, Ltd., Canada
MONTREAL Factory: Aurora, Ont. TORONTO

The Advertiser Would Like to Know
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Oxy-Acetylene Welding and Cutting Apparatus



Carter Welding Co., General Toronto
For Davis-Bournonville Oxy-Acetylene Apparatus

General Office and Factory, Jersey City, N.J.
Canadian Factory, Niagara Falls, Ont.
Sales Offices: New York, Boston, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, Detroit, St. Louis, San Francisco, Seattle.



WE MANUFACTURE RIVETS of every description, $\frac{5}{8}$ inch. dia. and smaller

PARMENTER & BULLOCH CO., LTD.
GANANOQUE, ONT.

ARMCO IRON Welding Rods

OXY-ACETYLENE

ELECTRIC

make Safe welding easy

ARMCO IRON Rods are practically pure iron and are peculiarly free from the sulphur, phosphorus, slag, oxides and other impurities that ordinarily destroy the homogeneity of the weld.

You will find it decidedly to your advantage to give ARMCO IRON Rods a careful test.

PAGE STEEL & WIRE CO.**Sales Offices: 30 Church St., New York**

Plants: Monessen, Pa., and Adrian, Mich.

Western Representatives: Steel Sales Corporation, Chicago.



11

National High Speed Cutters

(The Cutter that gives service)

Let me quote you on your next requisition

Drills**High Speed and Carbon**

Immediate shipment and right price.

J. A. M. TAYLOR

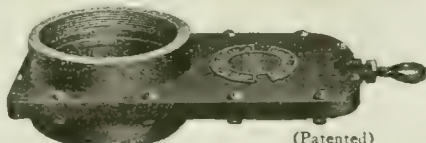
Machine Shop Supplies

Main 786

318 Stair Bldg., Toronto

NEW AIR-TIGHT BLAST GATE

FOR LOW AND MODERATE PRESSURES



(Patented)

"The Air-Tight Blast Gates in use in our plant have given entire satisfaction."

CANADIAN PACIFIC RAILWAY COMPANY, Montreal, Canada."

Our NEW AIR-TIGHT BLAST GATE will save the air (money) you are now losing through leaky blast gates.

Circular 123-T explains its many other advantages, outlining clearly its all-around superiority over the ordinary light, flimsy, cheap, leaky and unreliable blast gates, and the heavy, cumbersome, expensive and slow acting gate valves and stop cocks. Ask for circular and list of users.

W. S. ROCKWELL COMPANY

Furnace Engineers and Contractors

50 Church Street, New York (Hudson Terminal Bldg.)

Canadian Distributors: Drummond, McCall & Co., Ltd., Montreal



HYGIENIC TABLE-CABINET SAND-BLAST

One of the many sanitary types of
PANGBORN
SAND BLAST EQUIPMENT

If you haven't seen what you want write us - if we don't build it we will.

No requirement too large nor too small.



P.O. BOX 8503

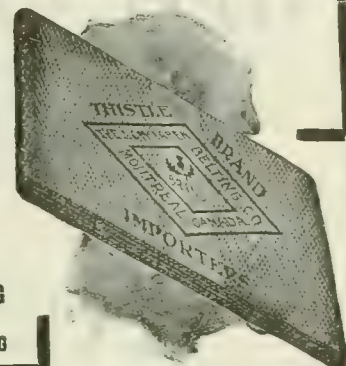
"THISTLE" BRAND RUBBER BELTING

"Maintenance of Quality"

is our motto, and our experience in the manufacture of belting since the year 1856 should be invaluable to you. Let us tell you all about this friction faced belting. The price will appeal to you.

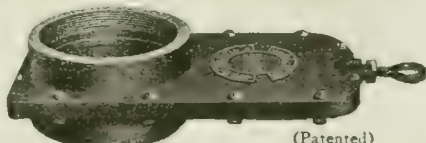
Write to-day.

J. C. McLAREN BELTING CO., LTD.
TORONTO, MONTREAL, WINNIPEG



NEW AIR-TIGHT BLAST GATE

FOR LOW AND MODERATE PRESSURES



(Patented)

"The Air-Tight Blast Gates in use in our plant have given entire satisfaction."

CANADIAN PACIFIC RAILWAY COMPANY, Montreal, Canada."

Our NEW AIR-TIGHT BLAST GATE will save the air (money) you are now losing through leaky blast gates.

Circular 123-T explains its many other advantages, outlining clearly its all-around superiority over the ordinary light, flimsy, cheap, leaky and unreliable blast gates, and the heavy, cumbersome, expensive and slow acting gate valves and stop cocks. Ask for circular and list of users.

W. S. ROCKWELL COMPANY

Furnace Engineers and Contractors

50 Church Street, New York (Hudson Terminal Bldg.)

Canadian Distributors: Drummond, McCall & Co., Ltd., Montreal

You want Tool Holders that have made good ARMSTRONG TOOL HOLDERS

Won The

GRAND PRIZE

THE HIGHEST POSSIBLE AWARD AT THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION.



THEY ALWAYS
MAKE GOOD

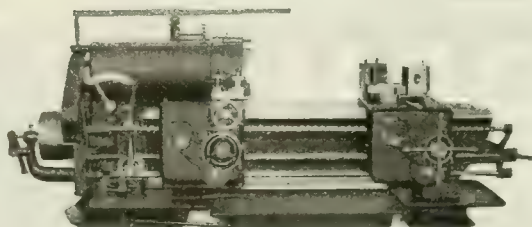
Write for Catalog.

Armstrong Bros. Tool Co.

"The Tool Holder People"

306 N. Francisco Ave.,

CHICAGO, U.S.A.

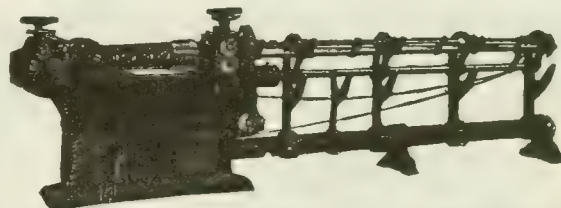


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MACHINE

Send Us Prints of Your Work

STEINLE TURRET MACHINE CO.

MADISON, WIS., U.S.A.

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Y**THE WIRE IS PERFECTLY STRAIGHT**

and cut to accurate lengths when it comes from our AUTO-MATIC WIRE STRAIGHTENING AND CUTTING MACHINE, whether it's $\frac{3}{4}$ " diameter or only .020" wire, hard or soft wire, highly polished or rough stock.

May we send you catalogue C?

The F. B. SHUSTER COMPANY, New Haven, Conn.

Formerly John Adt & Son.

Established 1866.

Also makers of Riveting Machines, Sprue Cutters, Cotter Pin Machines, etc.

STEEL CASTINGS

1 to 5,000 pounds

Highest Quality

PROMPT AND RELIABLE SERVICE

We make a specialty of Carbonizing Boxes and Cyanide and Lead Bath Pots

**SWEDISH CRUCIBLE STEEL CO.
OF CANADA, Ltd., Windsor, Ont.**

STEEL CASTINGS

We are well equipped to make all kinds of steel castings, 100 lbs. to 50,000 lbs.

DOMINION FOUNDRIES & STEEL

Hamilton

LIMITED

Ontario

STEEL CASTINGS

ELECTRIC Steel Castings of all kinds from 5 pounds to 5,000 pounds.

PROMPT DELIVERY

Manitoba Steel Foundries, Ltd.

1204 McArthur Building

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Manitoba



Castings

Brass, Gunmetal, Manganese Bronze, Copper, Nickel Alloys, Aluminum, etc.

MARINE AND LOCOMOTIVE ENGINE BEARINGS. MACHINE WORK AND ELECTRO PLATING. METAL PATTERN MAKING

United Brass & Lead, Ltd., Toronto, Ont.

SHAFTING

Cold Drawn, Turned and Polished Steel, Rounds, Squares, Hexagons and Flats, Steel Piston Rods, Pump Rods.

Special facilities for Keyseating up to 6 in. diameter.

THE

Canadian Drawn Steel Co.

HAMILTON

LIMITED

CANADA

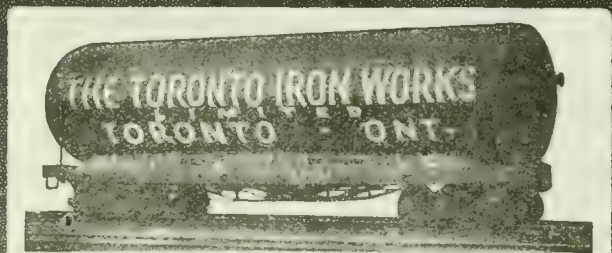


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CANADIAN MACHINERY

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PNEUMATIC WATER SUPPLY TANKS - SMOKE STACKS
BOILER BREECHING - RIVETED STEEL PIPE - BINS & HOPPERS

OAKITE CLEANS

*Our business is to
solve your cleaning problem
Put it up to us*

OAKLEY CHEMICAL CO
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Greenfield

Trade Mark Reg. U. S. Pat. Office

A universal grinder. A grinder with all attachments. A grinder that will handle all kinds of tool-sharpening as well as cylindrical, internal and surface grinding. An all-around machine for your tool-room.

Catalog No. 6.

Greenfield Machine Co.

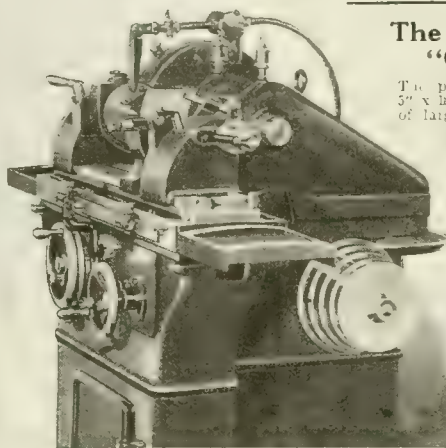
Greenfield, Mass., U.S.A.

Do you want help or have you something to sell, if so use the classified column in this paper.

INDUSTRIAL
MILITARY
AND MARINEONE PAIR
OR 20,000
PER DAY

WRITE FOR DETAILS

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The Newest of the "OTT" Line

The production capacity of our 5" x 18" Plan Grinder is worthy of larger and costlier machines. Fifty-seven varieties of work, more or less, from cast iron bushings to high-speed steel cutters, take their accurate finish from Ott Grinders; and the initial machine in any plant no matter what it makes — invariably recommends others. Write for full particulars.

**OTT
Grinder Co.**
Indianapolis,
Indiana



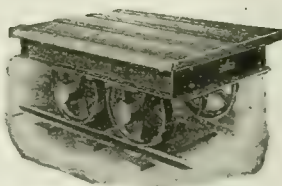
CASTINGS

THAT ARE DEPENDABLE
BRASS, BRONZE, GUNMETAL,
ALUMINUM and Other METALS
WRITE US

The Wentworth Mfg. Co.
Oak Avenue, Hamilton, Ontario

WHITING TRUCKS

All
kinds of
Shop and
Foundry
Trucks



Steel Frame Shop Truck

Write
for
Catalog.

Complete
Foundry
Equipment



Cranes
of all
Types

For Hardness Testing

THE
PYROSCOPE

in shop and laboratory use the
Standard Scleroscope

Universally adopted; direct reading; inexpensive, and the only instrument that agrees with others of its kind in all parts of the world, thus solving problems of ordering materials to specification.

BOOKLET FREE.

Heat Indication

by optical means is fast becoming the correct thing. The PYROSCOPE has solved the problem. Perfect constancy, inexpensive, no electricity used. Built to stand rough usage and upon common-sense lines. Used by the Government and best firms.

Shore Instrument & Mfg. Co. 555-7 W. 22nd St. New York
Agents for Canada: A. R. Williams Machy. Co., Ltd., Toronto, Ca.

THE SCLEROSCOPE
(Set)

THE TILTED TURRET

A CLEAR TRACK FOR THE STOCK

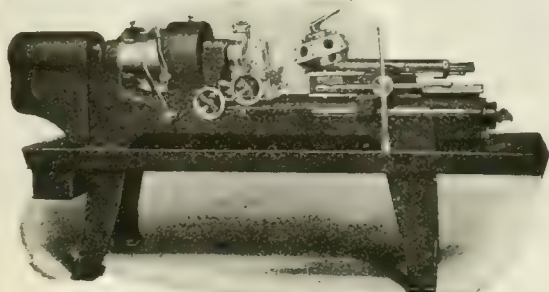
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SEND FOR
CATALOG "C"
OR
ASK THE USER

FIFTEEN YEARS OF SATISFIED USERS

WOOD TURRET MACHINE CO.

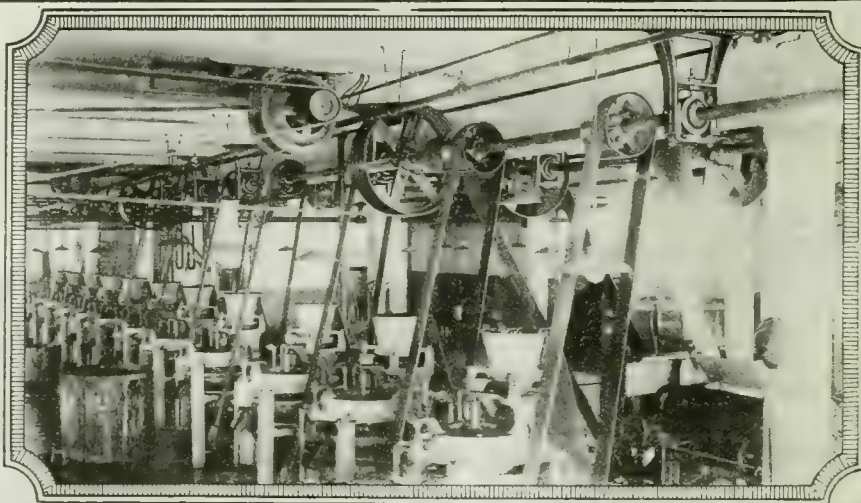
BRAZIL INDIANA U.S.A.



Power Losses

Belt slip, air fanning, too heavy pulleys—account for losses of hundreds or thousands of dollars in many plants throughout the country.

Check these power and fuel losses. Reduce belt slip and windage (air fanning) to a minimum. Make every ton of coal do full duty by installing



AMERICAN STEEL SPLIT PULLEYS

There are no "ifs" about these pulleys. They are guaranteed to minimize belt slip and wind resistance. They are guaranteed for double belt duty. They are guaranteed for rim speeds up to 6,000 feet per minute. There are over 4,000,000 in use because they transmit more

power with less waste than any other pulley in the market.

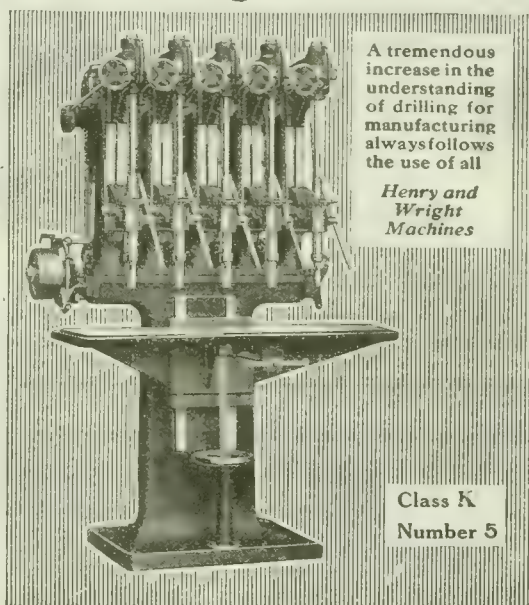
Write for 37 page book "Getting Maximum Pulley Efficiency." It will tell you how to eliminate pulley waste.

The American Pulley Company

Philadelphia, Pa.

HENRY & WRIGHT

Drilling Machines



A tremendous increase in the understanding of drilling for manufacturing always follows the use of all

Henry and Wright Machines

Class K
Number 5

The Henry & Wright Mfg. Co.
Hartford, Conn.

Canadian Fairbanks-Morse Co., Montreal, Toronto, Winnipeg;
A. R. Williams Machinery Co., Toronto, St. John, N.B.;
H. W. Petrie, Ltd., Toronto; Williams & Wilson, Montreal;
Rudel-Belnap Machinery Co., Montreal; Canada Machinery Corp.,
Galt, Ont.; Geo. F. Foss Machinery & Supply Co., Montreal;
General Supply Co., Montreal.



WE BUILD THEM BY HUNDREDS

Standardized Production enables us to offer this powerful Waterbury Grinder at such a low price. It grinds rapidly and accurately, all flat surfaces, dies, punches, planer, lathe, and other tools. Has adjustable table and tool rest with large radius of travel. Rigid, 3-point table supports giving great steadiness. A reliable, practical grinding outfit.

The Blake & Johnson Co., Waterbury, Conn.

Canadian Machinery BUYERS DIRECTORY

If what you want is not here, write us, and we will tell you where to get it. Let us suggest that you consult also the advertisers' index facing the inside back cover, after having secured advertisers' names from this directory. The information you desire may be found in the advertising pages. This department is maintained for the benefit and convenience of our readers. The insertion of our advertisers' names under proper headings is gladly undertaken, but does not become part of an advertising contract.

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Aikenhead Hardware Co., Toronto, Ont.
Canadian Fairbanks-Morse Co., Montreal.
The Geo. F. Foss Mch. & Supply Co., Montreal
Ford-Smith Mach. Co., Hamilton, Ont.
Norton Co., Worcester, Mass.
Plewes Ltd., Winnipeg, Man.
Pittsburgh Crushed Steel Co., Pittsburgh, Pa.
Rice, Lewis & Son, Toronto, Ont.

ACETYLENE

Carter Welding Co., Toronto, Ont.
Canadian Welding Works, Montreal, Que.
Prest-O-Lite Co., Inc., Toronto, Ont.

ACETYLENE GENERATORS

Prest-O-Lite Co., Inc., Toronto, Ont.

ACCUMULATORS, HYDRAULIC

Canadian Fairbanks-Morse Co., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Hydraulic Machy. Co., Ltd., Montreal, Que.
Metalwood Mfg. Co., Detroit, Mich.
Niles-Bement-Pond Co., New York.

AIR COMPRESSORS

Darling Bros. Ltd., Montreal, Quebec

AIR CYLINDERS

Smalley-General Co., Inc., Bay City, Mich.

AIR RECEIVERS

Can. Ingersoll-Rand Co., Sherbrooke, Que.
Canadian Welding Works, Montreal, Que.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.

AIR WASHERS

Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Ltd., Galt, Ont.

ALUMINUM

Canada Metal Co., Toronto.
United Brass & Lead, Ltd., Toronto.
Tallman Brass & Metal Co., Hamilton.

ALLOY, STEEL

Armstrong, Whitworth, of Canada, Montreal, Que.
Baker & Co., Inc., H., Montreal, Que.
Firth & Sons, Thos., Montreal, Que.
Hawkrider Bros. Co., Boston, Mass.
Standard Alloys Company, Pittsburgh, Pa.
Swedish Steel & Importing Co., Ltd., Montreal.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

ALTERNATING CURRENT, ELECTRIC

Welding Equipment

Atwell Corporation of Can., Toronto, Ont.

ARBORS

Canadian Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Ford-Smith Machine Co., Hamilton, Ont.
J. C. Wilson & Co., Belleville, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

ARCHITECTURAL IRON

Page Steel & Wire Co., Adrian, Mich.

ARRESTERS, DUST

Northern Crane Co., Walkerville, Ont.
Sheldons Ltd., Galt, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.
Pangborn Corporation, Hagerstown, Md.

AUTOGENOUS WELDING AND CUTTING

PLANTS
Canadian Welding Works, Montreal, Que.
Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.

AUTOMATIC MACHINERY

Baird Machine Co., Bridgeport, Conn.
Garlock-Walker Machinery Co., Toronto, Ont.
Gardner, Robt., & Son, Montreal.
National Acme Co., Cleveland, O. and Windsor
Riverside Machinery Depot, Detroit, Mich.
Pratt & Whitney Co., Dundas, Ont.
Roelofson Machine & Tool Co., Toronto, Can.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

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Aikenhead Hardware Co., Toronto, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Canada Metal Co., Toronto.
Colland Mfg. Co., Montreal, Que.
The Geo. F. Foss Mch. & Supply Co., Montreal
Hort Metal Co., Toronto.
Magnolia Metal Co., Montreal.
Rice, Lewis & Son, Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.
Wilkinson & Kompass, Hamilton, Ont.

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Canadian Fairbanks-Morse Co., Montreal.
Can. S K F Co., Toronto, Ont.
Chapman Double Ball Bearing Company, Toronto

BALLS, STEEL

Baker & Co., Inc., Montreal, Que.

BAROMETERS

Taylor Instrument Co., Rochester, N.Y.

BARRELS, SAND-BLAST

Pangborn Corporation, Hagerstown, Md.

BARRELS, STEEL SHOP

Baird Machine Co., Bridgeport, Conn.
Cleveland Wire Spring Co., Cleveland.

BARRELS, TUMBLING

Baird Machine Co., Bridgeport, Conn.
Northern Crane Works, Walkerville, Ont.
Wilson & Co., J. C., Belleville, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

BASE FACING MACHINES

Victoria Foundry Co., Ottawa, Ont.

BARS, BORING

Gisholt Machine Co., Madison, Wis.
Niles-Bement-Pond Co., New York.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

BARS, MERCHANT

Algoma Steel Corp., Sault Ste. Marie, Ont.

BARS, CONCRETE REINFORCING

Algoma Steel Corp., Sault Ste. Marie, Ont.

BELT CONVEYORS

Can. Link-Belt Co., Toronto, Ont.

BEARINGS, BRONZE

Wilson & Co., J. C., Belleville, Ont.
Wentworth Mfg. Co., Hamilton, Ont.

BELT LACING LEATHER

Aikenhead Hardware Co., Toronto, Ont.
Foss Mch. & Supply Co., The Geo. F., Montreal
Graton & Knight Mfg. Co., Worcester, Mass.
Rice, Lewis & Son, Toronto, Ont.

BELTING, BALATA

Baxter & Co., Ltd., J. R., Montreal, Que.
Canadian Welding Works, Montreal, Que.
Federal Engineering Co., Toronto, Ont.

BELTING, RUBBER

Can. Consolidated Rubber Co., Ltd., Montreal.
Gutta Percha & Rubber, Ltd., Toronto, Can.

BELTING, CHAIN

Canadian Fairbanks-Morse Co., Montreal.
Can. Link-Belt Co., Toronto, Ont.
Jones & Glasco, Montreal, Que.
Morse Chain Co., Ithaca, N.Y.
Whitney Mfg. Co., Hartford, Conn.

BELTING, CONVEYOR

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Baxter & Co., Ltd., J. R., Montreal, Que.
Canadian Fairbanks-Morse Co., Montreal.
Canadian Welding Works, Montreal, Que.
Federal Engineering Co., Ltd., Toronto, Ont.
Graton & Knight Mfg. Co., Worcester, Mass.
Jones & Glasco, Montreal, Que.
McLaren, J. C., Belting Co., Montreal, Que.
Morse Chain Co., Ithaca, N.Y.
Plewes, Ltd., Winnipeg, Man.
Rice, Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.

BELTING, FRICTION AND SURFACE

Can. Consolidated Rubber Co., Ltd., Montreal

BELTING, LEATHER

Can. Graton & Knight Mfg. Co., Montreal, Que.
Gutta Percha & Rubber, Ltd., Toronto, Can.

BELTING, STITCHED COTTON DUCK

Canadian Welding Works, Montreal, Que.
Dominion Belting Co., Hamilton, Ont.
Gutta Percha & Rubber, Ltd., Toronto, Can.

BELTING, WOVEN

Baxter & Co., Ltd., J. R., Montreal, Que.
Federal Engineering Co., Ltd., Toronto, Ont.

BENCH LEGS, STEEL

New Britain Mach. Co., New Britain, Conn.

BENCH DRAWERS, FRICTIONLESS

New Britain Mach. Co., New Britain, Conn.

BENDING ROLLS (PLUTE & AUGH)

Wickes Bros., Saginaw, Mich.

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Bertram & Sons Co., John, Dundas.
Bertrams, Limited, Edinburgh, Scotland.
Brown-Boggs Co., Ltd., Hamilton, Can.
Can. Blower & Forge Co., Kitchener, Canada.
Garlock-Walker Machinery Co., Toronto, Ont.
Blasting Machines, Sand
Ferracute Mach. Co., Bridgeton, N.J.
Garlock-Walker Machinery Co., Toronto, Ont.
Jardine, A. B., & Co., Hespeler, Ont.
National Machinery Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo, Ohio.

BILLET MARKERS

Mathews & Co., Jas. H., Pittsburgh, Pa.

BILLETS

Swedish Steel & Importing Co., Ltd., Montreal.
Algoma Steel Corp., Sault Ste. Marie, Ont.

BINS, STEEL

Dennis Wire & Iron Works, London, Ont.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Toronto Iron Works, Ltd., Toronto, Ont.

BLASTING MACHINES, SHOT AND STEEL GRIT

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

BLOOMS AND SLABS

Algoma Steel Corp., Sault Ste. Marie, Ont.

BLOWERS

Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Ltd., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
MacGovern & Co., Montreal, Que.
Riverside Machinery Depot, Detroit, Mich.

BLOW PIPES AND REGULATORS

Canadian Welding Works, Montreal, Que.
Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.

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Commercial Camera Co., Province, E.I.
Mulliner-Edlund Tool Co., Syracuse, N.Y.
Wickes Bros., Saginaw, Mich.

BOARTZ

Anderson & Co. of Canada, Geo., Montreal, Que.
Joyce, Koebel & Co., Inc., New York.

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MacLean Publishing Co., Toronto.

BOILERS

Dominion Bridge Co., Montreal, Quebec.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Marsh Engineering Works, Belleville, Ont.
Riverside Machinery Depot, Detroit, Mich.

BOLT CUTTERS AND NUT TAPERS

Aikenhead Hardware Co., Toronto, Ont.
Canadian Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Rice, Lewis & Son, Toronto, Ont.
Wells Brothers Co. of Canada, Galt, Ont.

BOLTS

Aikenhead Hardware Co., Toronto, Ont.
London Bolt & Hinge Works, London, Ont.
Rice, Lewis & Son, Toronto, Ont.
Manitoba Rods & Lst. Wks., Ltd., Wpg.
Steel Co. of Canada, Ltd., Hamilton, Ont.
United Brass & Lead, Ltd., Toronto.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

BOLT AND NUT MACHINERY

Bertram & Sons Co., John, Dundas.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Gardner & Son, Robt., Montreal.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
National Machinery Co., Tiffin, Ohio.
Riverside Machinery Depot, Detroit, Mich.
Williams Machinery Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

BOLT THREADING MACHINERY

Jardine & Co., Ltd., A. B., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
Victor Tool Co., Waynesboro, Pa.

BORING MACHINES, PNEUMATIC CYLINDER

Cleveland Pneumatic Tool Co. of Canada, Toronto.
Canadian Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Sherbrooke, Que.
Garlock-Walker Machinery Co., Toronto, Ont.

BORING MACHINES, UPRIGHT AND HORIZONTAL

Bertram & Sons Co., John, Dundas.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Giddings & Lewis Mfg. Co., Fond du Lac, Wis.
Gisholt Machine Co., Madison, Wis.
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Roelofson Machine & Tool Co., Toronto, Ont.
Riverside Machinery Depot, Detroit, Mich.

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Bertram & Sons Co., John, Dundas.
Betts Machine Co., Rochester, N.Y.
Canada Machinery Corp., Galt, Ont.
Gisholt Machine Co., Madison, Wis.
Foss Mch. & Supply Co., The Geo. F., Montreal
Niles-Bement-Pond Co., New York

BOXES, STEEL SHOP AND TOTE

Cleveland Wire Spring Co., Cleveland, Ohio.
New Britain Mach. Co., New Britain, Conn.

BRAKES

Brown, Boggs & Co., Hamilton, Can.
Electric Steel & Metals, Ltd., Welland, Ont.

BRASS AND COPPER BARS, RODS AND SHEETS

Brown's Copper & Brass Rolling Mills, New Toronto.
Tallman Brass & Metal Co., Hamilton, Ont.

BRASS FOUNDERS

Canada Metal Co., Toronto.
Greenleafs, Ltd., Belleville, Ont.
St. Lawrence Welding Co., Montreal, Que.
Tallman Brass & Metal Co., Hamilton, Ont.
United Brass & Lead Ltd., Toronto.
Wilson & Co., J. C., Belleville, Ont.

BRUQUET-INGOTS

Eastern Block Corporation, Chicago, Ill.

BRASS WORKING MACHINERY

Foster Machine Co., Elkhart, Ind.
Garlock-Walker Machinery Co., Toronto, Ont.
Warner & Swasey Co., Cleveland.
Niles-Bement-Pond Co., New York.
Prest-O-Lite Co. Inc., Toronto, Ont.
Riverside Machinery Depot, Detroit, Mich.
Wood Turret Machine Co., Brazil, Ind.
Williams Machy. Co., A. R., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

BRIDGES, RAILWAY AND HIGHWAY

Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

BRONZE RODS AND SHEETS, PLATES

Brown's Copper & Brass Rolling Mills, New Toronto.

BRONZE, NAVAL

Brown's Copper & Brass Rolling Mills, New Toronto.
Tollard Mfg. Co., Montreal, Que.
Canada Metal Co., Toronto.
Tallman Brass and Metal Co., Hamilton, Ont.
United Brass & Lead Ltd., Toronto.

BRONZE, COPPER

Canada Metal Co., Toronto.

BUFFING AND POLISHING MACHINERY

Ford-Smith Mach. Co., Hamilton, Ont.
Foss Mch. & Supply Co., The Geo. F., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
New Britain Machine Co., New Britain, Conn.

BUCKETS, DUMP

MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

BUCKETS, ELEVATOR

Can. Link-Belt Co., Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Que.

BUCKETS, CLAM SHELL, CRAB, DUMP

Can. Link-Belt Co., Toronto, Ont.
Marsh Engineering Works, Belleville, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Ltd., Walkerville, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

BULLDOZERS

Bertram & Sons Co., John, Dundas.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.

BURNERS, OIL AND NATURAL GAS

Northern Crane Works, Ltd., Walkerville, Ont.

BURRS, IRON AND COPPER

Parmenter & Bulloch Co., Gananoque, Ont.

BUSHINGS, BRONZE

Oberdorfer Brass Co., M. L., Syracuse, N.Y.

CABINETS, SAND BLAST

Pangborn Corporation, Hagerstown, Md.

CANADA SILVER SHEETS, ROLLS

Brown's Copper & Brass Rolling Mills, New Toronto.

CANNERS' MACHINERY

Bliss, E. W. Co., Brooklyn, N.Y.
Ferracute Mach. Co., Bridgeton, N.J.
Brown, Boggs & Co., Hamilton, Can.

CANNERS' CONVEYORS

Can. Link-Belt Co., Toronto, Ont.
Wilson & Co., J. C., Belleville, Ont.

CARBONIZING BOXES

Swedish Crucible Steel Co., Windsor, Ont.

CARRIERS

Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

CARRIERS, PNEUMATIC TUBE

Jones & Glasco, Montreal.

CARS, INDUSTRIAL

Can. Blower & Forge Co., Kitchener, Can.
Canadian Fairbanks-Morse Co., Ltd., Montreal.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.
Marsh Engineering Works, Belleville, Ont.
Sheldons, Limited, Galt, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

CARS, STEEL BODY

Marsh Engineering Works, Belleville, Ont.

CASTINGS, MACHINERY

Tollard Mfg. Co., Montreal, Que.
Winnipeg Iron Foundry Co., Winnipeg.
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, ALUMINUM, BRASS,**BRONZE, COPPER**

Algoma Steel Corp., Sault Ste. Marie, Ont.
Alexander Fleck, Ltd., Ottawa.
Greenleafs, Ltd., Belleville, Ont.
Oberdorfer Brass Co., M. L., Syracuse, N.Y.
St. Lawrence Welding Co., Montreal, Que.
Tallman Brass & Metal Co., Hamilton.
United Brass & Lead Ltd., Toronto.
Wentworth Mfg. Co., Hamilton, Ont.

CASTINGS, BRASS AND IRON

Algoma Steel Corp., Sault Ste. Marie, Ont.
Tollard Mfg. Co., Montreal, Que.

CASTINGS, GRAY IRON

Bernard Industrial Co., The A., Fortierville, Que.
Brown, Boggs & Co., Ltd., Hamilton, Can.
Alexander Fleck, Ltd., Ottawa.
Gardner & Son, Robt., Montreal.
Greenleafs, Ltd., Belleville, Ont.
Hull Iron & Steel Foundries, Ltd., Hull, Que.
International Malleable Iron Co., Guelph, Ont.
Kennedy & Sons, Ltd., Wm., Owen Sound.
Marsh Engineering Works, Belleville, Ont.
Pleasantville Foundry Co., Pleasantville, Que.
Sheldons, Limited, Galt, Ont.
Tollard Mfg. Co., Montreal, Que.
Fittings, Ltd., Oshawa, Ont.
Hamilton Co., Wm., Peterboro.
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, ROUGH

Tollard Mfg. Co., Montreal, Que.

CASTINGS, NICHROME

Can. Driver-Harris Co., Harrison, N.J.

CASTINGS, STEEL CHROME AND MANGANESE STEEL

Thos. Davidson Mfg. Co., Montreal, Que.
Dominion Foundries & Steel, Ltd., Hamilton, Ont.
Hull Iron & Steel Foundries, Ltd., Hull, Que.
Kennedy & Sons, Ltd., Owen Sound.

CASTINGS, MALLEABLE

Fittings, Ltd., Oshawa, Ont.
International Malleable Iron Co., Guelph, Ont.

CASTINGS, NICKEL STEEL

Hull Iron & Steel Foundries, Ltd., Hull, Que.

CEMENT MACHINERY

Canadian Fairbanks-Morse Co., Ltd., Montreal.
Gardner, Robt., & Son, Montreal.

CEMENT HANDLING MACHINERY

Can. Link-Belt Co., Toronto, Ont.

CENTERING MACHINES

Victoria Foundry Co., Ottawa, Ont.

CENTRE REAMERS

Bertram & Sons Co., John, Dundas.
Gardner, Robt., & Son, Montreal.
Hurlbut, Rogers Mach. Co., South Sudbury, Mass.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co. of Canada, Galt, Ont.

CHAIN, WELDED COIL

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

CHAIN BLOCKS

Aikenhead Hardware Co., Toronto, Ont.
Canadian Fairbanks-Morse Co., Ltd., Montreal.
Ford Chain Block & Mfg. Co., Philadelphia, Pa.
Garlock-Walker Machy. Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

Rice Lewis & Son, Toronto, Ont.

Wright Mfg. Co., Lisbon, Ohio.

CHAIN LINKS, DETACHABLE

Fittings, Ltd., Oshawa, Ont.

CHAINS, FOR ELEVATORS AND CONVEYORS

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Morse Chain Co., Ithaca, N.Y.

CHAIN, MALLEABLE, DETACHABLE AND RIVETED

Can. Link-Belt Co., Toronto, Ont.

Morse Chain Co., Ithaca, N.Y.

CHAIN DRIVES

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Coventry Chain Co., Coventry, England.

Jones & Glasco, Montreal, Que.

Morse Chain Co., Ithaca, N.Y.

CHASERS

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Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.

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Toronto Testing Laboratory, Ltd., Toronto.

CHESTS, TOOL

Mechanics Tool Chest Co., Toronto.

CHROME VANADIUM STEEL

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J. F. A. Comstedt, New York City, N.Y.

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Garvin Machine Co., New York.

CHUCKS, COLLET, AIR

Smalley-General Co., Inc., Bay City, Mich.

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Almond Mfg. Co., T. R., Ashburnham, Mass.
Bertram & Sons Co., John, Dundas.
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Canadian Fairbanks-Morse Co., Ltd., Montreal.
Cushman Chuck Co., Hartford, Conn.
Foss Mch. & Supply Co., The Geo. F., Montreal.
Gardner, Robt., & Son, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Chicago, Ill.
Jacobs Mfg. Co., Hartford, Conn.
Ker & Goodwin, Brantford.
Knight Metal Products, Ltd., Toronto, Ont.
Modern Tool Co., Erie, Pa.
Rice, Lewis & Son, Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.
Whiton Machine Co., D. E., New London, Conn.

CHUCKS, DRILL, AUTOMATIC AND KEYLESS

Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener, Canada.
Whitney Mfg. Co., Hartford, Conn.

CHUCKS, FRICTION AND TAP

Victor Tool Co., Waynesboro, Pa.
Wells Bros. Co. of Canada, Galt, Ont.

CHUCKS, MAGNETIC

Heald Machine Co., Worcester, Mass.

CHUCKS, RING WHEEL

Ford-Smith Mach. Co., Hamilton, Ont.
Gardner Machine Co., Beloit, Wis.

CHUCKS, WRENCH

Thomas Elevator Co., Chicago, Ill.

CHUCKING MACHINES

Garvin Machine Co., New York.
Gisholt Machine Co., Madison, Wis.
New Britain Machine Co., New Britain, Conn.
National Acme Co., Windsor, Vt.
Niles-Bement-Pond Co., New York.
Roelofson Machine & Tool Co., Toronto, Ont.
Warner & Swasey Co., Cleveland, O.
Wood Turret Mach Co., Brazil, Ind., U.S.A.

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Williams & Co., J. H., Brooklyn, N.Y.

CLEANING COMPOUND

Oakley Chemical Co., New York.

CLOCKS, WATCHMAN, PORTABLE

Gisholt Machine Co., Madison, Wis.

Hardinge Bros., Inc., Chicago, Ill.

CLUTCHES, CHAIN

Jones & Glasco, Montreal, Que.

CLUTCHES, FRICTION AND PULLEY

Bernard Industrial Co., A., Fortierville, Que.

Can. Link-Belt Co., Toronto, Ont.

Carlyle Johnson Mach. Co., Manchester, Conn.

Jones & Glasco, Montreal, Que.

Positive Clutch & Pulley Works, Ltd., Toronto.

COAL HANDLING MACHINERY

Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Marsh Engineering Works, Ltd., Belleville, Ont.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

Northern Crane Works, Ltd., Walkerville, Ont.

Whiting Foundry Equipment Co., Harvey, Ill.

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Williams & Co., J. H., Brooklyn, N.Y.

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Sheldons, Limited, Galt, Ont.

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Cleveland Pneumatic Tool Co. of Canada, Toronto.

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Hinckley Machine Co., Hinckley, Ill.

MacGovern & Co., Montreal, Que.

Riverside Machinery Depot, Detroit, Mich.

Smart-Turner Machine Co., Hamilton, Ont.

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Smalley-General Co., Inc., Bay City, Mich.

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Hommer & Wilson, Hamilton, Ont.

Marten Machine Co., Hamilton, Ont.

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Victoria Foundry Co., Ottawa.

Wilson & Co., J. C., Belleville, Ont.

Welland Motor & Machine Co., Welland, Ont.

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Bertram & Sons Co., John, Dundas.

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Only a Drawing-in Bolt Required to Hold Arbors and Collets

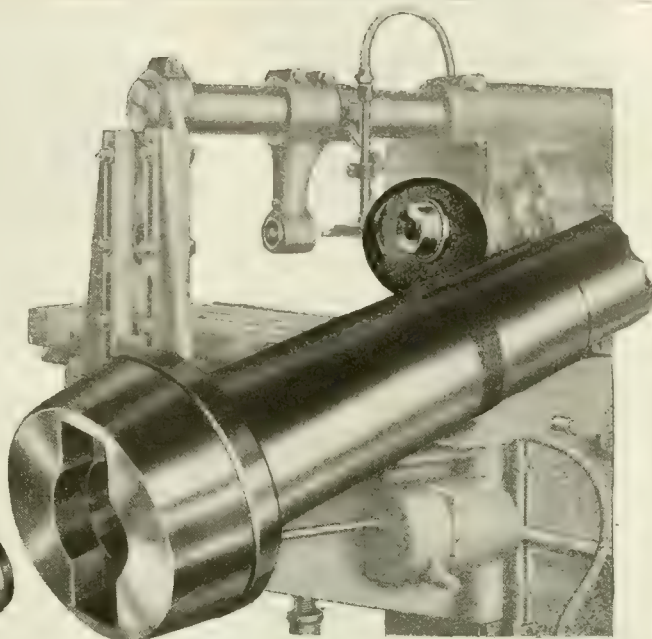
Clutch on arbor or collet fits recess in spindle and drawing-in bolt securely holds arbor or collet in place. This construction does away with plates, screws and loose parts; and as illustration shows

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All Brown & Sharpe arbors have a shank as large in diameter as the largest standard arbor of the same taper.

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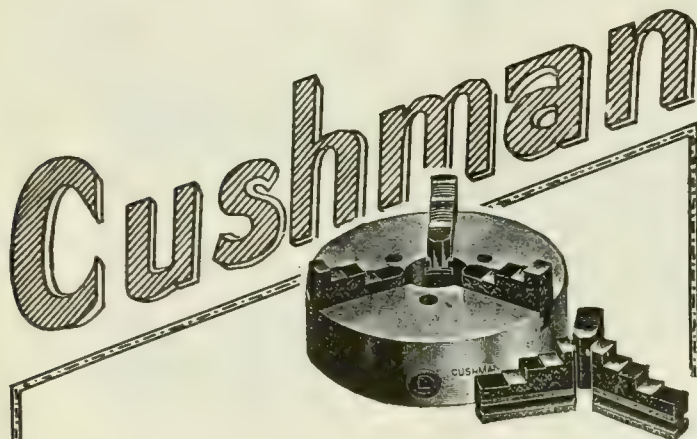


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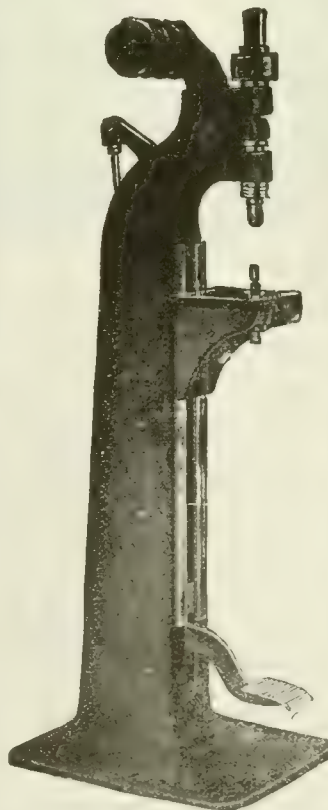
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CRANES, GANTRY
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Whiting Foundry Equipment Co., Harvey, Ill.

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Dominion Bridge Co., Montreal.
Hebern, John T., Ltd., Toronto, Ont.
MacKinnon Steel Co., Sherbrooke, Quebec.
Manitoba Bridge & Iron Wks. Ltd., Wpg., Can.
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Niles-Bement-Pond Co., New York.
Northern Crane Works, Walkerville

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Whiting Foundry Equipment Co., Harvey, Ill.
J. C. Wilson & Co., Belleville, Ont.

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Graton & Knight Mfg. Co., Worcester, Mass.

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Rice, Lewis & Son, Toronto, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Hurlburt, Rogers Machy Co., South Sudbury, Mass.
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Prest-O-Lite Co., Inc., Toronto, Ont.
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Canadian Welding Works, Montreal, Que.
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Wheel Truing Tool Co., Detroit.

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Butterfield & Co., Rock Island, Que.
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Gardner, Robt., & Son, Montreal.
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Morse Twist Drill & Mch. Co., New Bedford, Mass.
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Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Rickert-Shafer Co., Erie, Pa.
Standard Machy & Supplies, Ltd., Montreal.
Stoll Co., Inc., D. H., Buffalo, N.Y.
Wells Brothers of Canada, Galt, Ont.

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Landis Machine Co., Waynesboro, Pa.

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Butterfield & Co., Rock Island, Que.
Firth & Sons, Thos., Montreal, Que.
Landis Machine Co., Waynesboro, Pa.
Wells Brothers Co. of Canada, Galt, Ont.

DIES, SELF-OPENING
Geometric Tool Co., New Haven.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit, Mich.
Wells Brothers Co. of Canada, Galt, Ont.

DIE SINKERS
Becker Milling Machine Co., Boston, Mass.
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.

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Becker Milling Machine Co., Boston, Mass.
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.

DIE SINKERS
Becker Milling Machine Co., Boston, Mass.
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.

DIE STEEL, HOT AND COLD WORK

Armstrong, Whitworth of Canada, Montreal, Que.
Firth & Sons, Thos., Montreal, Que.

DIES FOR SCREW PLATES
Wells Brothers Co. of Canada, Galt, Ont.

DIES, SHEET METAL WORKING

E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada.
Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ont.
Normac Machine Co., St. Catharines, Ont.
Stoll Co., D. H., Buffalo, N.Y.
Windsor Mach. & Tool Co., Windsor, Ont.
Worth Engineering Co., Toronto, Ont.

DIES, SCREW AND THREAD

Butterfield & Co., Rock Island, Que.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit, Mich.
National Acme Co., Cleveland, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Wells Brothers Co. of Canada, Galt, Ont.

DISCS, LEATHER, STEEL

Graton & Knight Mfg. Co., Worcester, Mass.
Swedish Steel & Importing Co., Ltd., Montreal.

DIRECT CONNECTED UNITS
MacGovern & Co., Montreal, Que.

DRAFT, MECHANICAL

W. H. Banfield & Sons, Toronto.
Butterfield & Co., Rock Island, Que.
Can. Blower & Forge Co., Kitchener, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Pratt & Whitney Co., Dundas, Ont.
Sheldons, Ltd., Galt, Ont.

DRESSERS, GRINDING AND EMERY WHEEL

Baxter & Co., Ltd., J. R., Montreal, Que.
Can. Desmond-Stephan Mfg. Co., Hamilton, Ont.
Ford-Smith Mach Co., Hamilton, Ont.
Wheel Truing Tool Co., Windsor, Ont.

DRILL PRESSES

Aurora Tool Works, Aurora, Ind.
W. F. & John Barnes Co., Rockford.
Can. Blower & Forge Co., Kitchener, Ont.
Canada Machinery Corp., Galt, Ont.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Niles-Bement-Pond Co., New York.
Riverside Machinery Depot, Detroit, Mich.
United States Mach. Tool Co., Cincinnati, O.
A. R. Williams Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

DRILL RODS

Swedish Steel & Importing Co., Ltd., Montreal.

DRILLING MACHINES, GANG

Barnes, W. F. & John, Co., Rockford, Ill.
Bilton Mach. Tool Co., Bridgeport, Conn.
Canada Machinery Corp., Galt, Ont.
Silver Mfg. Co., Salem, Ohio.

DRILLING MACHINES, LOCOMOTIVE AND MULTIPLE SPINDLE

John Bertram & Sons Co., Dundas.
Bilton Mach. Tool Co., Bridgeport, Conn.
Can. Blower & Forge Co., Kitchener, Ont.
Canada Machinery Corp., Galt, Ont.
Canadian Fairbanks-Morse Co., Montreal.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Henry & Wright Mfg. Co., Hartford, Conn.
A. B. Jardine & Co., Hespeler, Ont.
Landis Tool Co., Waynesboro, Pa.
National Acme Co., Cleveland, Ohio.
Niles-Bement-Pond Co., New York.
Rockford Drilling Mach. Co., Rockford, Ill.

DRILLING MACHINES

RADIAL AND TURRETT
John Bertram & Sons Co., Dundas.
Canadian Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Henry & Wright Mfg. Co., Hartford, Conn.
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Reed-Prentice Co., Worcester, Mass.

DRILLING MACHINES, SENSITIVE

Bilton Mach. Tool Co., Bridgeport, Conn.
W. F. & John Barnes Co., Rockford, Ill.
Canadian Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt, Ont.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Henry & Wright Mfg. Co., Hartford, Conn.
Landis Tool Co., Waynesboro, Pa.
D. McKenzie Machinery Co., Guelph, Ont.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
United States Mach. Tool Co., Cincinnati, Ohio.

DRILLING MACHINES, UPRIGHT AND HORIZONTAL

Aurora Tool Works, Aurora, Ind.
John Bertram & Sons Co., Dundas.
Garlock-Walker Machinery Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener, Ont.
Canada Machinery Corp., Galt, Ont.
Ford-Smith Machine Co., Hamilton, Ont.
Giddings & Lewis Mfg. Co., Fond du Lac, Wis.
Fry's (London), Ltd., London, England.
Garlock-Walker Machinery Co., Toronto, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Landis Tool Co., Waynesboro, Pa.
R. McDougall Co., Galt.
Reed-Prentice Co., Worcester, Mass.
Niles-Bement-Pond Co., New York.
Rockford Drilling Mach. Co., Rockford, Ill.
Silver Mfg. Co., Salem, Ohio.
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Canadian Fairbanks-Morse Co., Montreal.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Fry's (London), Ltd., London, England.
Garlock-Walker Machinery Co., Toronto, Ont.
Millers Falls Co., Millers Falls, Mass.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
United States Electrical Tool Co., Cincinnati

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Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Wilt Twist Drill Co. of Canada, Walkerville, Ont.

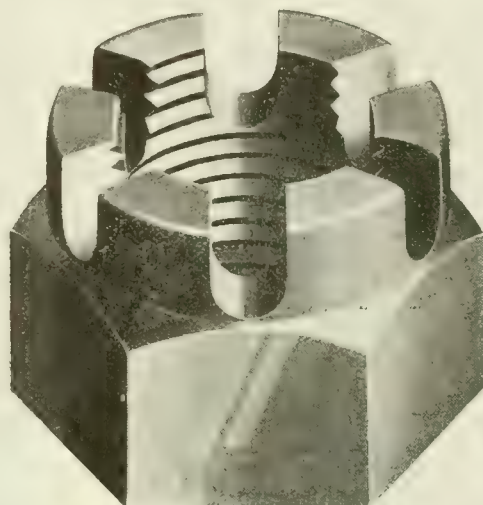
SCREWS AND NUTS

Nuts—

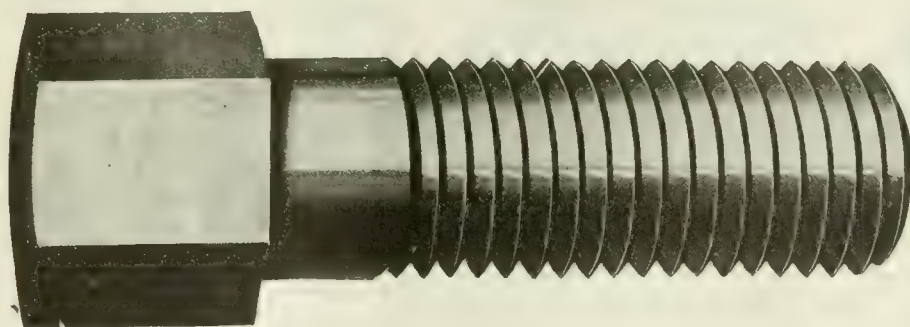
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 Niles-Bement-Pond Co., New York.
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 Marshall & Co., Geo., Toronto, Ont.
 Morse Twist Drill & Mch. Co., New Bedford, Mass.
 W. F. & John Barnes Co., Rockford, Ill.
 Perfect Machine Co., Galt, Ont.
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 Pratt & Whitney Co., Dundas, Ont.
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 Whitman & Barnes Mfg. Co., St. Catharines, Ont.
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 Garlock-Walker Machinery Co., Toronto, Ont.
 A. B. Jardine & Co., Hespeler, Ont.
 Millers Falls Co., Millers Falls, Mass.
 Morse Twist Drill & Mch. Co., New Bedford, Mass.
 Pratt & Whitney Co., Dundas, Ont.
 Rice Lewis & Son, Toronto, Ont.
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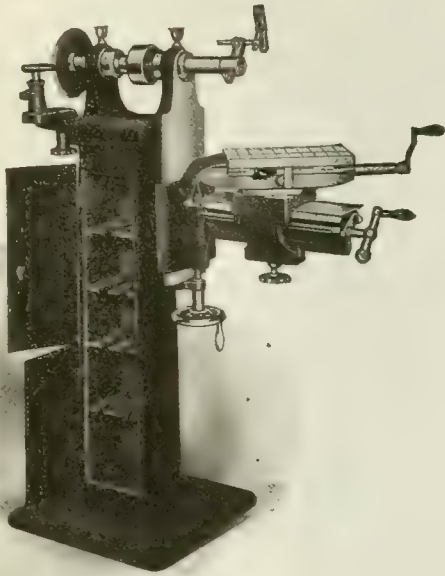
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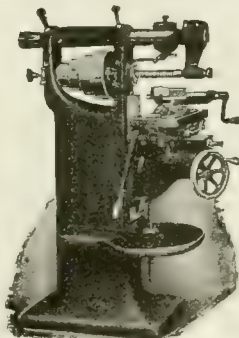
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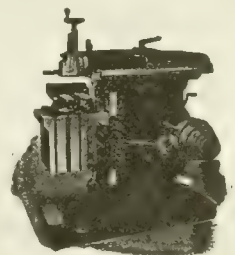
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 Hamilton Gear & Machine Co., Toronto.
 Victoria Foundry Co., Ottawa, Ont.
 Hull Iron & Steel Foundries, Ltd., Hull, Que.
 Illinois Tool Works, Chicago, Ill.
 Jones & Glasco, Montreal.
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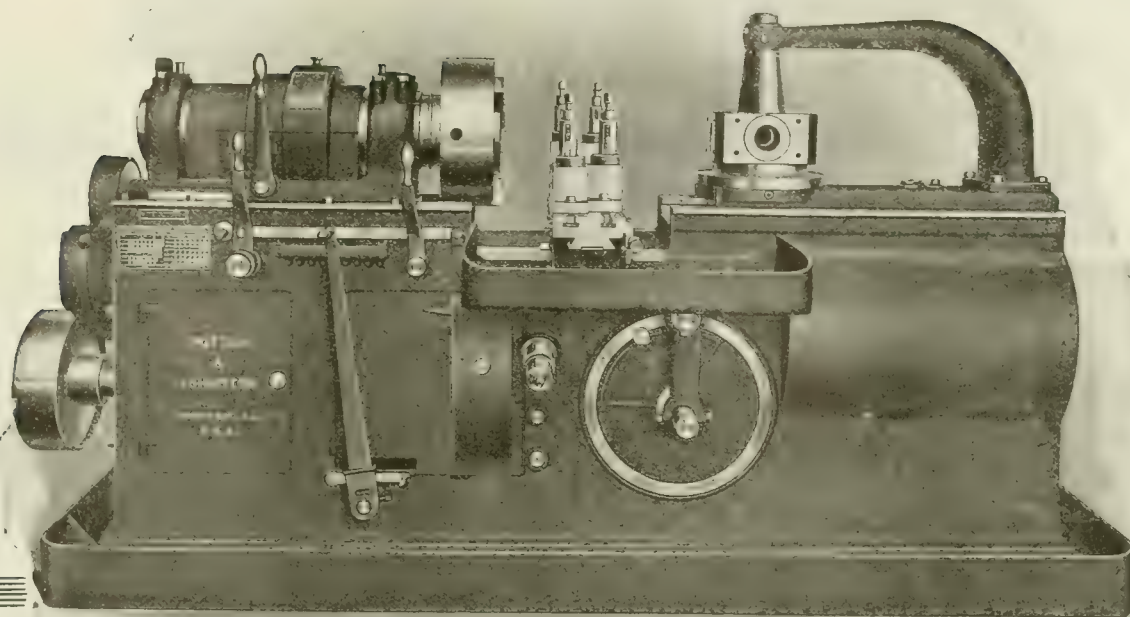
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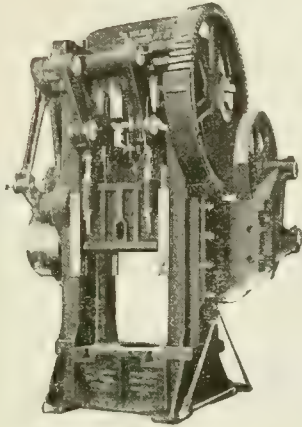
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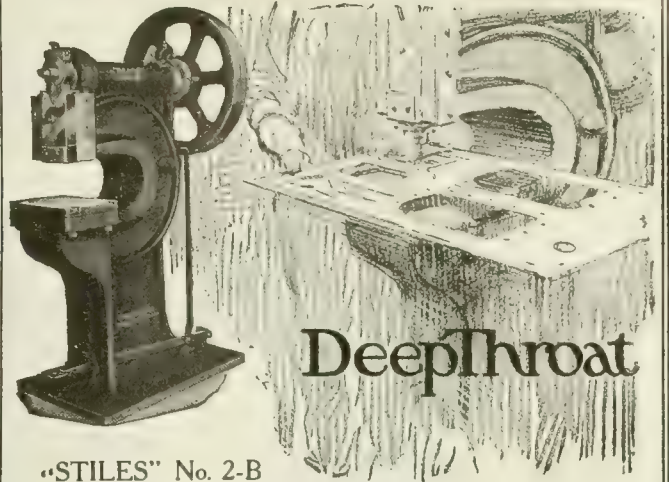
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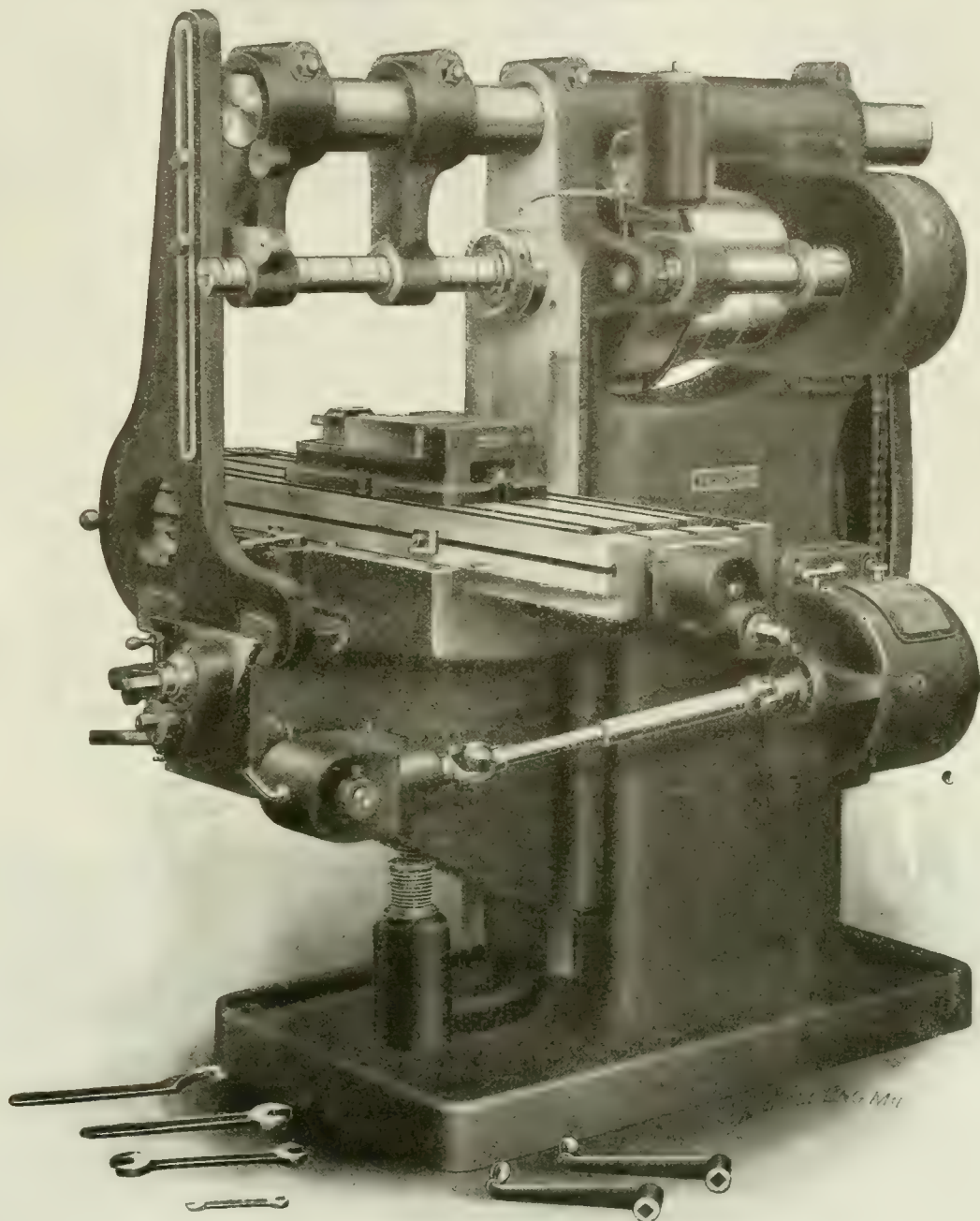
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Ferracute Mach. Co., Bridgeton, N.J.
Can. Fairbanks-Morse Co., Montreal.
Gardner, Robt., & Son, Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Mulliner-Enlund Tool Co., Syracuse, N.Y.
Marten Machine Co., Hamilton, Ont.
Pratt & Whitney Co., Dundas, Ont.
Stoll Co., D. H., Buffalo, N.Y.
Toledo Machine & Tool Co., Toledo, O.

PUNCHES, POWER

John Bertram & Sons Co., Dundas, Ont.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Consolidated Press Co., Hastings, Mich.
Ferracute Mach. Co., Bridgeton, N.J.
Garlock-Walker Machinery Co., Toronto, Ont.
A. B. Jardine & Co., Limited, Hespeler, Ont.
Niles-Bement-Pond Co., New York.
Stoll Co., D. H., Buffalo, N.Y.
Wickes & Co., Saginaw, Mich.

PUNCHES, CHROME, VANADIUM SHELL

Hammond Steel Co., Inc., Syracuse, N.Y.

PUNCHING MACHINES, HORIZONTAL

Bertrams, Ltd., Edinburgh, Scotland.
Bertram & Sons Co., John, Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Wickes & Co., Saginaw, Mich.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Niles-Bement-Pond Co., New York.

PYROMETERS

Bristol Co., Waterbury, Conn., U.S.A.
Shore Instrument & Mfg. Co., New York City
Taylor Instrument Co., Rochester, N.Y.
Thwing Instrument Co., Philadelphia, Pa.

QUARTERING MACHINES

Bertram & Sons Co., John, Dundas, Ont.
Niles-Bement-Pond Co., New York.

RAILING, IRON AND BRASS

Can. Welding Works, Montreal, Que.
United Brass & Lead, Ltd., Toronto, Ont.

RAIL BENDERS

Algoma Steel Corp., Sault Ste. Marie, Ont.
Niles-Bement-Pond Co., New York.

RADIAL DRILLING MACHINE, WALL

Levi-Faughar Co., Boston.
Wickes & Co., Saginaw, Mich.

RAILROAD TOOLS

Can. Fairbanks-Morse Co., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Niles-Bement-Pond Co., New York.

RAIL OVERHEAD

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

RAILWAY EQUIPMENT

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

RATCHETS

Keystone Mfg. Co., Buffalo, N.Y.

RAW HIDE PINIONS (SEE GEARS)**REAMERS, ADJUSTABLE**

Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pewees, Ltd., Winnipeg, Man.
Pratt & Whitney Co., Dundas, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.
The McCrosky Reamer Co., Meadville, Pa.
The Kelly Reamer Co., Cleveland, O.
Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.
Whitman & Barnes Mfg. Co., St. Catharines, Ont.
Will Twist Drill Co., Walkerville, Ont.

REAMERS, PIPE, CYLINDER**AND LOCOMOTIVE**

Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Kelly Reamer Co., Cleveland, O.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

REAMERS, BRIDGE, EXPANDING**AND HIGH SPEED**

Aikenhead Hardware Co., Toronto.
Baxter & Co., Ltd., J. R., Montreal, Que.
Bosser & Co., Inc., S. F., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
The McCrosky Reamer Co., Meadville, Pa.
Cleveland Twist Drill Co., Cleveland.
Gisholt Machine Co., Madison, Wis.
Higgins Tool Works, Chicago, Ill.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

REAMERS, STEEL TAPER**AND SELF-FEEDING**

Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Illinois Tool Works, Chicago, Ill.
A. B. Jardine & Co., Hespeler, Ont.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

REAMER FLUTING MACHINES

Garvin Machine Co., New York.

REAMING MACHINES, PNEUMATIC

Cleveland Pneumatic Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto, Ont.

RECORDING INSTRUMENTS

Bristol Co., Waterbury, Conn.
Gisholt Machine Co., Madison, Wis.
Taylor Instrument Co., Rochester, N.Y.

REGULATORS, AUTOMATIC

Electric Steels & Metals, Ltd., Welland, Ont.

REGULATORS, PRESSURE

Can. Fairbanks-Morse Co., Montreal.

TEMPERATURE

Taylor Instrument Co., Rochester, N.Y.

RESPIRATORS

Strong, Kennard & Nutt Co., Cleveland, Ohio.

RIVETS, TUBULAR, BIFURCATED

Parmenter & Bulloch Co., Gananoque.
Rice Lewis & Son, Toronto, Ont.

Steel Co. of Canada, Ltd., Hamilton, Ont.

RIVETS, IRON, COPPER AND BRASS

Aikenhead Hardware Co., Toronto, Ont.
Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.
Parmenter & Bulloch Co., Gananoque.
Rice, Lewis & Son, Toronto, Ont.
Steel Co. of Canada, Ltd., Hamilton, Ont.

RIVETERS, PNEUMATIC, HYDRAULIC,**HAMMER, COMPRESSION**

Can. Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Montreal.
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto, Ont.
Independent Pneumatic Tool Co., Chicago, Ill.
Niles-Bement-Pond Co., New York.

RIVETING MACHINES, ELASTIC**ROTARY BLOW**

Grant Mfg. & Machine Co., Bridgeport, Conn.
High-Speed Hammer Co., Rochester, N.Y.
F. B. Shuster Co., New Haven, Conn.

ROAD BUILDING EQUIPMENT

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

RODS

General Steel Co., Milwaukee.
Page Steel & Wire Co., Adrian, Mich.

ROLLER CHAINS

Can. Link-Belt Co., Toronto, Ont.
Jones & Glasco, Montreal.

ROLLS, BENDING AND STRAIGHTENING

John Bertram & Sons Co., Dundas.
Brown, Boggs Co., Ltd., Hamilton, Canada.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Niles-Bement-Pond Co., New York.
Toledo Machine & Tool Co., Toledo, O.

ROOF COOLERS

Electric Steels & Metals, Ltd., Welland, Ont.

ROLLS, CRUSHING

Can. Link-Belt Co., Toronto.

RUBBER MILL DRIVES

Can. Link-Belt Co., Toronto, Ont.

RUBBER MILL MACHINERY

Bertrams, Ltd., Edinburgh, Scotland.

RULES

Brown & Sharpe Mfg. Co., Providence.
James Chesterman & Co., Ltd., Sheffield, Eng.
Rice Lewis & Son, Toronto, Ont.
L. S. Starrett Co., Athol, Mass.

SAW MILL CONVEYORS

Can. Link-Belt Co., Toronto, Ont.

SAND MILLS

Frost Mfg. Co., Chicago, Ill.

SAND-BLAST EQUIPMENT

Pangborn Corporation, Hagerstown, Md.

SAFETY APPLIANCES

Strong, Kennard & Nutt Co., Cleveland, Ohio.
Strong, Kennard & Nutt Co., Cleveland, Ohio.

SAFETY APPLIANCE GOGGLES

Willson Co., Inc., T. A., Reading, Pa.

SAND BLAST ABRASIVES

Pangborn Corporation, Hagerstown, Md.

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

SAND MIXING MACHINERY

Frost Mfg. Co., Chicago, Ill.

SANDING MACHINES

Canada Machinery Corp., Galt, Ont.

SAW MILL MACHINERY

Can. Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt, Ont.
Gardner, Robt., & Son, Montreal.
Curtis Pneumatic Machy. Co., St. Louis, Mo.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

SASH WEIGHTS AND WRENCHES

Puttings, Ltd., Ottawa, Ont.

SAWS, CIRCULAR, METAL

F. C. Atkins & Co., Indianapolis, Ind.
Pewees, Ltd., Winnipeg, Man.

Simonds Mfg. Co., Pittsburg, Mass.

Tabor Mfg. Co., Philadelphia, Pa.

Hunter Saw & Mach. Co., Pittsburgh, Pa.

Tabor Mfg. Co., Philadelphia, Pa.

SAWS, SPLITTING

F. C. Atkins & Co., Indianapolis, Ind.
Taylor, J. A. M., Stair Bldg., Toronto, Ont.

SCALERS

Shore Instrument & Mfg. Co., New York City.

SCREENING MACHINERY

Can. Link-Belt Co., Toronto, Ont.

SCREW EXTRACTORS

Cleveland Twist Drill Co., Cleveland, O.

SCREW MACHINE PRODUCTS

Galt Machine Screw Co., Galt, Ont.
Fawcett Metal Products, Ltd., Toronto, Ont.
United Press & Lead, Ltd., Toronto.
Wentworth Mfg. Co., Hamilton, Ont.

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HARRISON, N. J.

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MANCHESTER
ENGLAND



SCREW MACHINES, HAND, AUTOMATIC

Brown & Sharpe Mfg. Co., Providence, R.I.
 Can. Fairbanks-Morse Co., Montreal.
 Foster Machine Co., Elkhart, Ind.
 Garlock-Walker Mach. Co., Ltd., Toronto, Ont.
 Garvin Machine Co., New York.
 A. B. Jardine & Co., Hespeler.
 National Acme Co., Cleveland, Ohio.
 New Britain Machine Co., New Britain, Conn.
 Pratt & Whitney Co., Dundas, Ont.
 Warner & Swasey Co., Cleveland, O.
 A. R. Williams Machy Co., Toronto.
 Wood Turret Mach. Co., Brazil, Ind., U.S.A.
 Williams & Wilson, Ltd., Montreal, Que.

SCREW MACHINES, AUTOMATIC MULTIPLE SPINDLE

National Acme Co., Cleveland, Ohio.
 Cincinnati Automatic Mach. Co., Cincinnati, O.
 New Britain Machine Co., New Britain, Conn.
 Riverside Machinery Depot, Detroit, Mich.

SCREWS

Can. B. K. Morton, Toronto, Montreal.
 Galt Machine Screw Co., Galt, Ont.
 National Acme Co., Montreal, Que.
 Rice Lewis & Son, Toronto, Ont.
 Steel Co. of Canada, Ltd., Hamilton, Ont.
 United Brass & Lead Ltd., Toronto.
 Wilkinson & Kompass, Hamilton, Ont.

SCREW PLATES

Butterfield & Co., Rock Island, Que.
 A. B. Jardine & Co., Hespeler.
 Morse Twist Drill & Mch. Co., New Bedford, Mass.
 Rice Lewis & Son, Toronto, Ont.
 Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.
 Wells Bros. Co. of Canada, Galt, Ont.
 Wilkinson & Kompass, Hamilton, Ont.

SCREW SLOTS

Garvin Machine Co., New York.
 National Acme Co., Cleveland, Ohio.
 Pratt & Whitney Co., Dundas, Ont.

SECOND-HAND MACHINERY

The Geo. F. Foss Mch. & Supply Co., Montreal.
 Riverside Machinery Depot, Detroit, Mich.

SEPARATORS, SAND

Pangborn Corporation, Hagerstown, Md.

SET SCREWS, SAFETY

Aikenhead Hardware Co., Toronto, Ont.
 Allen Mfg. Co., Hartford, Conn.
 Bristol Co., Waterbury, Conn., U.S.A.
 Wilkinson & Kompass, Hamilton, Ont.

SHANKS, STRAIGHT AND TAPER

Jacobs Mfg. Co., Hartford, Conn.

SHAPERS

John Bertram & Sons Co., Dundas.
 Can. Fairbanks-Morse Co., Montreal.
 Canada Machinery Corp., Galt, Ont.
 The Geo. F. Foss Mch. & Supply Co., Montreal.
 Gardner, Robt. & Son, Montreal.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Hendey Machine Co., Torrington, Conn.
 Hamilton Mach. Tool Co., Hamilton, Ohio.
 Rhodes Mfg. Co., Hartford, Conn.
 Steptoe Co., John, Cincinnati, Ohio.

SHAFTING

Algoma Steel Corp., Sault Ste. Marie, Ont.
 Can. Fairbanks-Morse Co., Montreal.
 Garlock-Walker Mach. Co. Ltd., Toronto, Ont.
 Jones & Glasco, Montreal.
 Niles-Bement-Pond Co., New York.
 Can. Drawn Steel Co., Hamilton, Ont.
 Pratt & Whitney Co., Dundas, Ont.
 Rice Lewis & Son, Toronto, Ont.
 A. R. Williams Machy Co., Toronto.
 Wilkinson & Kompass, Hamilton, Ont.
 Wilson & Co., J. C., Belleville, Ont.

SHARPENING STONES

Norton Co., Worcester, Mass.
 Rice, Lewis & Son, Toronto, Ont.

SHEARING MACHINES, ANGLE IRON**BAR AND GATE**

John Bertram & Sons Co., Dundas.
 Bertrams, Ltd., Edinburgh, Scotland.
 Canada Machinery Corp., Galt, Ont.
 Garlock-Walker Machinery Co., Toronto, Ont.
 A. B. Jardine & Co., Hespeler, Ont.
 Niles-Bement-Pond Co., New York.
 Toledo Machine & Tool Co., Toledo.

SHEARS, POWER

John Bertram & Sons Co., Dundas.
 Bliss, E. W., Co., Brooklyn, N.Y.
 Brown, Boggs & Co., Ltd., Hamilton, Canada.
 Can. Blower & Forge Co., Kitchener, Ont.
 Canada Machinery Corp., Galt, Ont.
 Ferracute Machine Co., Bridgeton, N.J.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Wickes & Co., Saginaw, Mich.
 A. B. Jardine & Co., Limited, Hespeler, Ont.
 National Machy Co., Tiffin, Ohio.
 Niles-Bement-Pond Co., New York.
 Stoll Co., Inc., D. H., Buffalo, N.Y.
 Toledo Machine & Tool Co., Toledo.

SHEARS, PNEUMATIC

Toledo Machine & Tool Co., Toledo, Ohio.

SHEARS, SQUARING

Brown, Boggs & Co., Hamilton, Canada.
 Stoll Co., D. H., Buffalo, N.Y.

SHEET METAL WORKING TOOLS

Baird Machine Co., Bridgeport, Conn.
 Bliss, E. W., Co., Brooklyn, N.Y.
 Brown, Boggs & Co., Hamilton, Canada.
 Peck, Stow & Wilson, Southampton, Conn.
 Stoll Co., D. H., Buffalo, N.Y.

SHEET METAL STAMPINGS

Dominion Forge & Stg. Co., Walkerville, Ont.

SHELL BANDING MACHINES, HYDRAULIC

Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
 Metalwood Mfg. Co., Detroit, Mich.
 Perrin, Wm. R., Toronto, Ont.
 West Tire Setter Co., Rochester, N.Y.

SHEET METAL WORKING MACHINERY

Stoll Co., Inc., D. H., Buffalo, N.Y.

SHELVING, STEEL

Dennis Wire & Iron Works, London, Ontario.

SHELL PAINTING MACHINES

Can. Blower & Forge Co., Kitchener, Ont.
 Sheldons, Ltd., Galt, Ont.

SHELL RIVETERS

Grant Mfg. & Machine Co., Bridgeport, Conn.
 High Speed Hammer Co., Rochester, N.Y.

SHIPBUILDING

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

SHOP FURNITURE

Dennis Wire & Iron Works, London, Ontario.
 New Britain Mach. Co., New Britain, Conn.

SIDE TOOLS

Armstrong Bros. Tool Co., Chicago.
 Can. B. K. Morton, Toronto, Montreal.
 Williams & Co., J. H., Brooklyn, N.Y.

SILENT CHAINS

Can. Link-Belt Co., Toronto, Ont.
 Jones & Glasco, Montreal.

SLEDGES

Aikenhead Hardware Co., Toronto, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 Whitman & Barnes Mfg. Co., St. Catharines, Ont.
 Wilkinson & Kompass, Hamilton, Ont.

SLINGS, CHAIN

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

SLOTTERS

Betts Machine Co., Rochester, N.Y.
 Garvin Machine Co., New York.
 National Acme Co., Cleveland, Ohio.
 Niles-Bement-Pond Co., New York.
 Rhodes Mfg. Co., Hartford, Conn.

SMOKESTACKS

Canadian Welding Works, Montreal, Que.
 MacKinnon Steel Co., Sherbrooke, Quebec.
 Marsh Engineering Works, Belleville, Ont.

SOCKETS

Brown & Sharpe Mfg. Co., Providence.
 Cleveland Twist Drill Co., Cleveland, Ohio.
 Keystone Mfg. Co., Buffalo, N.Y.
 Modern Tool Co., Erie, Pa.
 Morse Twist Drill & Mch. Co., New Bedford, Mass.
 Rice, Lewis & Son, Toronto, Ont.

SOCKET HEAD CAP SCREWS

Allen Mfg. Co., Hartford, Conn.

SOLDERING IRONS

Aikenhead Hardware Co., Toronto, Ont.
 Brown, Boggs & Co., Hamilton, Canada.
 Prest-O-Lite Co., Inc., Toronto, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 United Brass & Lead Ltd., Toronto.

SOLDER

Aikenhead Hardware Co., Toronto, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 Tallman Brass & Metal Co., Hamilton.
 United Brass & Lead, Ltd., Toronto.

SPEED REDUCING GEARS

Can. Link-Belt Co., Toronto, Ont.
 Jones & Glasco, Montreal.

SPIKES

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

SPRINGS, MACHINERY

Barnes, Wallace Co., Bristol, Conn.
 Can. Steel Foundries, Ltd., Montreal, Que.
 Cleveland Wire Spring Co., Cleveland.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Jas. Steele Ltd., Quebec, Ont.

SPECIAL MACHINERY

Baird Machine Co., Bridgeport, Conn.
 Banfield W. H. & Sons, Toronto.
 Beaver Engineering Co., Montreal, Que.
 Bertram, John, & Sons Co., Dundas.
 Bliss, E. W. Co., Brooklyn, N.Y.
 Brown, Boggs & Co., Hamilton, Canada.
 Brown Engineering Corp., Toronto, Ont.
 Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
 Ferracute Mach. Co., Bridgeton, N.J.
 Ford Smith Machine Co., Hamilton, Ont.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Garvin Machine Co., New York.
 Gooley & Edmund, Inc., Courtland, N.Y.
 John H. Hall & Sons, Bradford.
 Hydraulic Machy. Co., Ltd., Montreal, Que.
 A. B. Jardine & Co., Hespeler, Ont.
 National Acme Co., Cleveland, Ohio.
 Mulliner & Enlund Tool Co., Syracuse, N.Y.
 Marten Machine Co., Hamilton, Ont.
 Reed-Prentice Co., Worcester, Mass.
 Sleeper & Hartley, Inc., Worcester, Mass.
 Stoll Co., D. H., Buffalo, N.Y.
 Victoria Foundry Co., Ottawa, Ont.
 Welland Motor & Machine Co., Welland, Ont.
 Wilson & Co., J. C., Belleville, Ont.
 William R. Perrin, Ltd., Toronto.
 Windsor Mach. & Tool Co., Windsor, Ont.

SPRING COILING AND WINDING MACHINERY

Baird Machine Co., Bridgeport, Conn.
 Garvin Machine Co., New York.
 Sleeper & Hartley, Inc., Worcester, Mass.

SPRING MAKING MACHINERY (AUTOMATIC)

Baird Machine Co., Bridgeport, Conn.
 Sleeper & Hartley, Inc., Worcester, Mass.

SPROCKETS, CHAIN

Can. Link-Belt Co., Toronto, Ont.
 Grant Gear Works, Boston, Mass.
 Jones & Glasco, Montreal.
 Morse Chain Co., Ithaca, N.Y.
 Philadelphia Gear Works, Philadelphia, Pa.
 Wilson & Co., J. C., Belleville, Ont.

SPROCKET WHEELS, CAST

Can. Link-Belt Co., Toronto, Ont.
 Perrin, Wm. R., Toronto.
 Wilson & Co., J. C., Belleville, Ont.

STAIRS, IRON

Can. Welding Works, Montreal, Que.
 Canada Wire & Iron Goods Co., Hamilton, Ont.

STAMPINGS, SHEET BRASS, COPPER,**ALUMINUM AND STEEL**

Dona Forge & Stamping Co., Walkerville, Ont.
 Homer & Wilson, Hamilton, Ont.
 Wentworth Mfg. Co., Hamilton, Ont.

STAMPING MACHINERY

Bliss Co., E. W., Brooklyn, N.Y.
 Brown, Boggs & Co., Hamilton, Canada.
 Canada Machinery Corp., Galt, Ont.
 Ferracute Mach. Co., Bridgeton, N.J.

STAMPS, STEEL ALPHABET, FIGURES

Matthews, Jas. H. & Co., Hartford, Conn.
 Pritchard-Andrews Co., Ottawa, Can.

STAPLE MACHINES

Sleeper & Hartley, Inc., Worcester, Mass.

STEAM APPLIANCES

Darling Bros., Ltd., Montreal, Quebec.

STEAM SEPARATORS AND TRAPS

Can. Fairbanks-Morse Co., Montreal.
 Sheldons, Ltd., Galt, Ont.

STEEL, CRUCIBLE TOOL

Hammond Steel Co., Inc., Syracuse, N.Y.
 Hillingworth Steel Co., John, New York, N.Y.
 Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL, CARBON, FERRO-TUNGSTEN

Armstrong, Whitworth of Canada, Montreal, Que.
 Boker & Co., Inc., H., Montreal, Que.
 Can. B. K. Morton, Toronto, Montreal.
 Firth & Sons, Thos., Montreal, Que.
 Latrobe Electric Steel Co., Latrobe, Pa.
 Vanadium-Alloys Steel Co., Pittsburgh, Pa.
 Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL CASTINGS

Joliet Steel Co., Montreal, Que.
 Kennedy & Sons, Wm., Owen Sound, Ont.
 Cw. Brakeshoe Co., Sherbrooke, Que.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.
 Swedish Crucible Steel Co., Windsor, Ont.

STEEL, COLD ROLLED

Can. Drawn Steel Co., Hamilton, Ont.
 Rice Lewis & Son, Toronto, Ont.
 Swedish Steel & Importing Co., Ltd., Montreal.
 Union Drawn Steel Co., Hamilton, Ont.

STEEL PRESSURE BLOWERS

Can. Blower & Forge Co., Kitchener, Ont.
 Can. Fairbanks-Morse Co., Montreal.
 Sheldons, Ltd., Galt, Ont.

STEEL, NICKEL

Firth & Sons, Thos., Montreal, Que.
 Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL, HIGH SPEED

Armstrong Whitworth of Canada, Ltd., Montreal.
 Atkins & Co., Wm., Sheffield, Eng.
 Boker & Co., Inc., H., Montreal, Que.
 Can. Fairbanks-Morse Co., Montreal.
 Can. B. K. Morton, Toronto, Montreal.
 H. A. Drury Co., Ltd., Montreal.
 Marshall & Co., Geo., Toronto, Ont.
 Firth & Sons, Thos., Montreal, Que.
 Hawkridge Bros. Co., Boston, Mass.
 Hillingworth Steel Co., John, New York, N.Y.
 Latrobe Electric Steel Co., Latrobe, Pa.
 Plewes, Ltd., Winnipeg, Man.
 Rice Lewis & Son, Toronto, Ont.
 Standard Alloys Company, Pittsburgh, Pa.
 Swedish Steel & Importing Co., Ltd., Montreal.
 Vanadium-Alloys Steel Co., Pittsburgh, Pa.
 Vulcan Crucible Steel Co., Aliquippa, Pa.; represented in Canada by Norton, Callard & Co., Montreal, Que.

STEEL, GRIT

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

STEEL, CHROME AND MANGANESE

Joliet Steel Co., Montreal, Que.

STEEL, OPEN HEARTH

Hillingworth Steel Co., John, New York, N.Y.

STEEL, CRUSHED

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

STEEL ROCK DRILL

Armstrong, Whitworth of Canada, Montreal, Que.

STEEL SPECIAL ELECTRIC ALLOY

Hammond Steel Co., Inc., Syracuse, N.Y.

STELLITE, HIGH-SPEED TOOL METAL

Deloro Smelting & Refining Co., Toronto, Ont.

STEEL, STRUCTURAL

Algoma Steel Corp., Sault Ste. Marie, Ont.

STEEL, VANADIUM

Armstrong, Whitworth of Canada, Montreal, Que.

STOCK RACKS FOR BARS, PIPING, ETC.

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
 New Britain Machine Co., New Britain, Conn.

STOCKS, PIPE

Butterfield & Co., Rock Island, Que.
 A. B. Jardine & Co., Limited, Hespeler, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 Wells Bros. Co. of Canada, Galt, Ont.

STOOLS, STEEL SHOP

New Britain Machine Co., New Britain, Conn.

STRAIGHTENING MACHINERY

Baird Machinery Co., Bridgeport, Conn.

STRAND

Pure Steel & Wire Co., Adrian, Mich.

SUPPLIES, CONTRACTORS'

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

STRUCTURES, STEEL BUILDINGS

Manitoba Bridge & Iron Wks., Ltd., Wpg., Can.

SWITCHES, RAILWAY

Can. Steel Foundries, Ltd., Montreal.

TABLES, SAND-BLAST

Pangborn Corporation, Hagerstown, Md.

TACK (DOUBLE POINT) MACHINES

Sleeper & Hartley, Inc., Worcester, Mass.

TAPPING MACHINES (PNEUMATIC)

Cleveland Pneumatic Tool Co. of Can., Toronto.

TANKS, GASOLINE AND OIL

Bowser & Co., Inc., S. F., Toronto, Ont.
Canadian Welding Works, Montreal, Que.
Dominion Bridge Co., Montreal, Quebec.
Dominion Forge & Stamping Co., Walkerville.
MacKinnon Steel Co., Sherbrooke, Que.
Marsh Engineering Works, Belleville, Ont.
St. Lawrence Welding Co., Montreal, Que.

TANKS, STEEL, WATER PRESSURE

Bowser & Co., Inc., S. F., Toronto, Ont.
Can. Welding Works, Montreal, Que.
Dominion Bridge Co., Montreal, Quebec.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Marsh Engineering Works, Belleville, Ont.
St. Lawrence Welding Co., Montreal, Que.
Toronto Iron Works, Ltd., Toronto.

TANK WAGONS

Canadian Welding Works, Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Toronto Iron Works, Ltd., Toronto.

TAPES, MEASURING

James Chesterman & Co., Ltd., Sheffield, Eng.
Rice, Lewis & Son, Toronto, Ont.

TAPPING MACHINES AND ATTACHMENTS

Bertram, John, & Sons Co., Dundas.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
The Geometric Tool Co., New Haven.
J. H. Hall & Sons, Brantford, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murphy Machine & Tool Co., Detroit.
Niles-Bement-Pond Co., New York.
Rickert-Shafer Co., Erie, Pa.
National-Acme Co., Cleveland, Ohio.
L. S. Starrett Co., Athol, Mass.
Whitney Mfg. Co., Hartford, Conn.

TAPS, ADJUSTABLE

Baxter Co., Ltd., J. R., Montreal, Que.
Baker & Co., Inc., H., Montreal, Que.
Butterfield & Co., Rock Island, Que.
Geometric Tool Co., New Haven.
Modern Tool Co., Erie, Pa.
Murphy Machine & Tool Co., Detroit.
Victor Tool Co., Waynesboro, Pa.

TAPS, DIES AND WRENCHES

Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
The Geo. F. Ross Mch. & Supply Co., Montreal.
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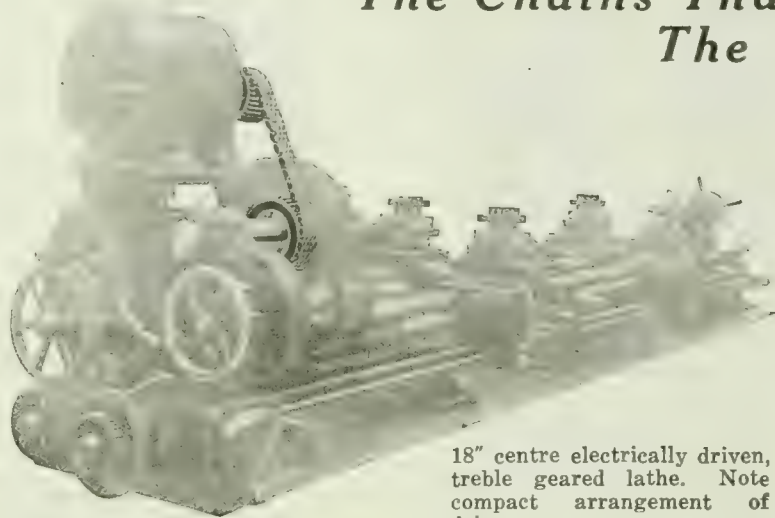
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CANADIAN MACHINERY

AND MANUFACTURING NEWS

A weekly newspaper devoted to the machinery and manufacturing interests.

Vol. XXI.

TORONTO, JANUARY 23, 1919.

No. 4

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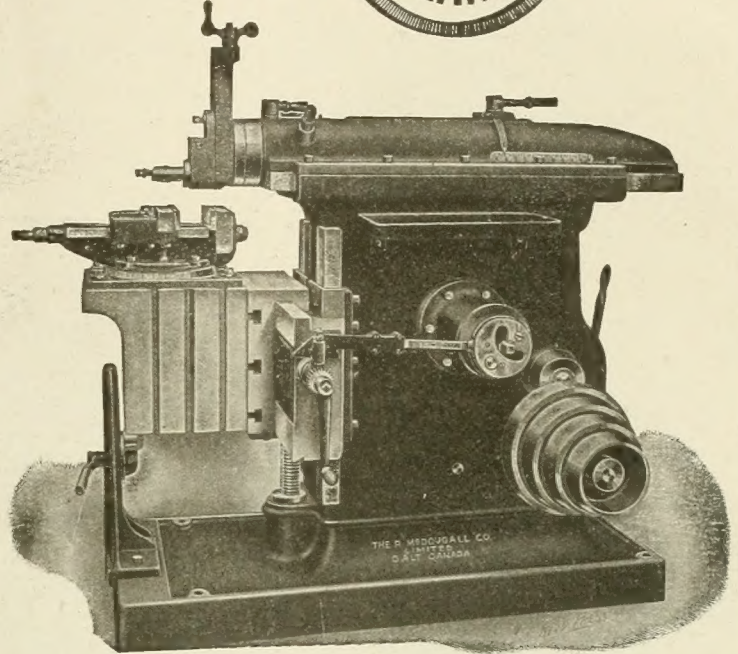
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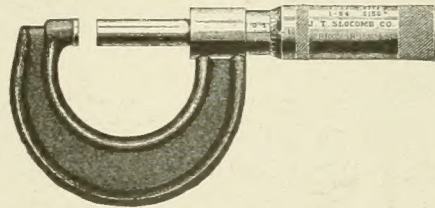
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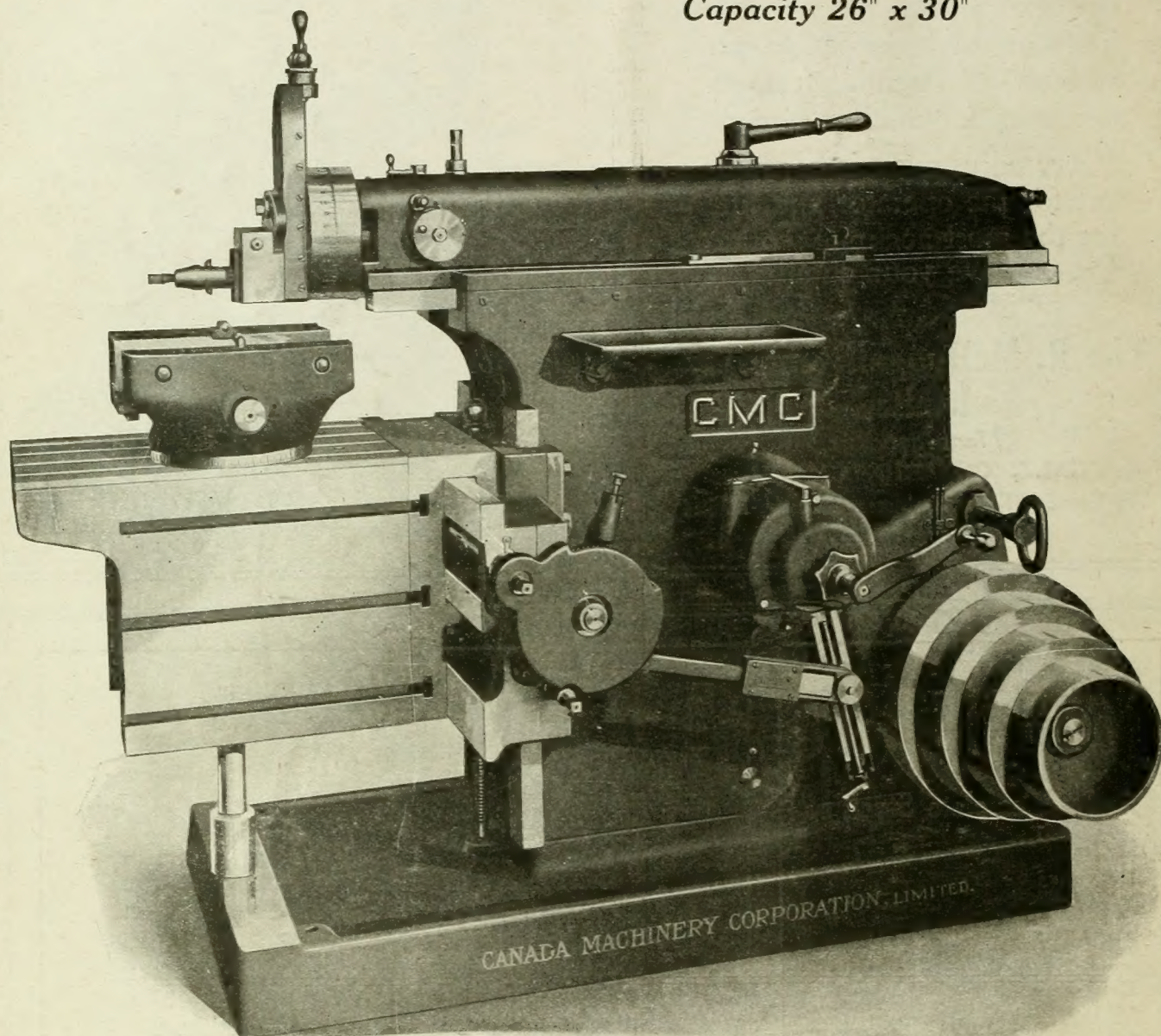
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